ORDER NO. SD82082302C8

Service Manual

Direct Drive Automatic Turntable System

SL-6

[E], [EK], [XL], [EG], [EB], [EF], [XA], [EH], [Ei], [EC], [XM]

SL-6(K)

[E], [EK], [EG], [EH], [EF], [XA]

*** The cabinet and dust cover are available in black color and silver types.**
*** The black type model is provided with (K) in the Service Manual.**

Areas

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EG] is available in F.R. Germany.
* [EB] is available in Belgium.
* [EF] is available in France.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [EH] is available in Holland.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.
* [XM] is available in Central South America.

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply:	~110-120/220-240V, 50 or 60 Hz
Power consumption:	11 W
Dimensions: (W×H×D)	31.5 × 8.8 × 31.5 cm (12-1/2" × 3-1/2" × 12-1/2") 31.5 × 39 × 31.5 cm (12-1/2" × 15-23/64" × 12-1/2") (Maximum height when top (dust cover) is open.)
Weight:	4.6 kg (10.1 lb.)

■ Turntable section

Type:	Direct drive Automatic turntable Auto start/Auto lead-in Auto return Auto stop Programmable band selection Repeat play Auto speed select Manual speed selection possible Auto size select Record presence detection
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	F·G servo control
Turntable platter:	Aluminum die-cast Diameter 30 cm (12")
Turntable speeds:	33-1/3 rpm and 45 rpm Auto speed select (Manual selection possible)
Wow and flutter:	0.012% WRMS* 0.025% WRMS (JIS C5521) ±0.035% peak (IEC 98A Weighted)

* Measured by obtaining signal from built-in frequency generator of motor assembly.

Rumble:	−56 dB (IEC 98A Unweighted) −78 dB (IEC 98A Weighted)

■ Tonearm section

Type:	Dynamic balanced type Linear tracking tonearm 4-pivot gimbal suspension
Effective length:	10.5 cm (4-1/8")
Tracking error angle:	Within ±0.1°
Effective mass:	9 g (including cartridge)
Resonance frequency:	12 Hz
Tonearm drive motor:	DC motor
Phono cable capacitance:	150 pF

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

SL-6

■ Cartridge section

Type:	Moving magnet stereo cartridge One point suspension system
Magnet:	Samarium cobalt (Sm-Co)
Frequency response	10 Hz~40 kHz 20 Hz~10 kHz ±1 dB
Output voltage:	2.5 mV at 1 kHz, 5 cm/s. zereo to peak lateral velocity (7 mV at 1 kHz, 10 cm/s. zereo to peak 45° velocity [DIN 45 500])
Channel separation:	More than 22 dB at 1 kHz
Channel balance:	Within 1.8 dB at 1 kHz
Recommended load impedance:	47 kΩ~100 kΩ
Compliance (dynamic):	12×10^{-6} cm/dyne at 100 Hz
Stylus pressure range:	1.25 ±0.25 g (1.25± 2.5 mN)
Weight:	6 g (cartridge only)
Replacement stylus:	EPS-23ES (Elliptical stylus)

- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
  - ★ 220V (50/60 Hz) for Continental Europe.
  - ★ 240V (50/60 Hz) for United Kingdom and Australia.
  - ★ 110V/120V/220V/240V (50/60 Hz) for other areas.
  - — [XA and XM areas]• for other areas is provided with voltage selector.

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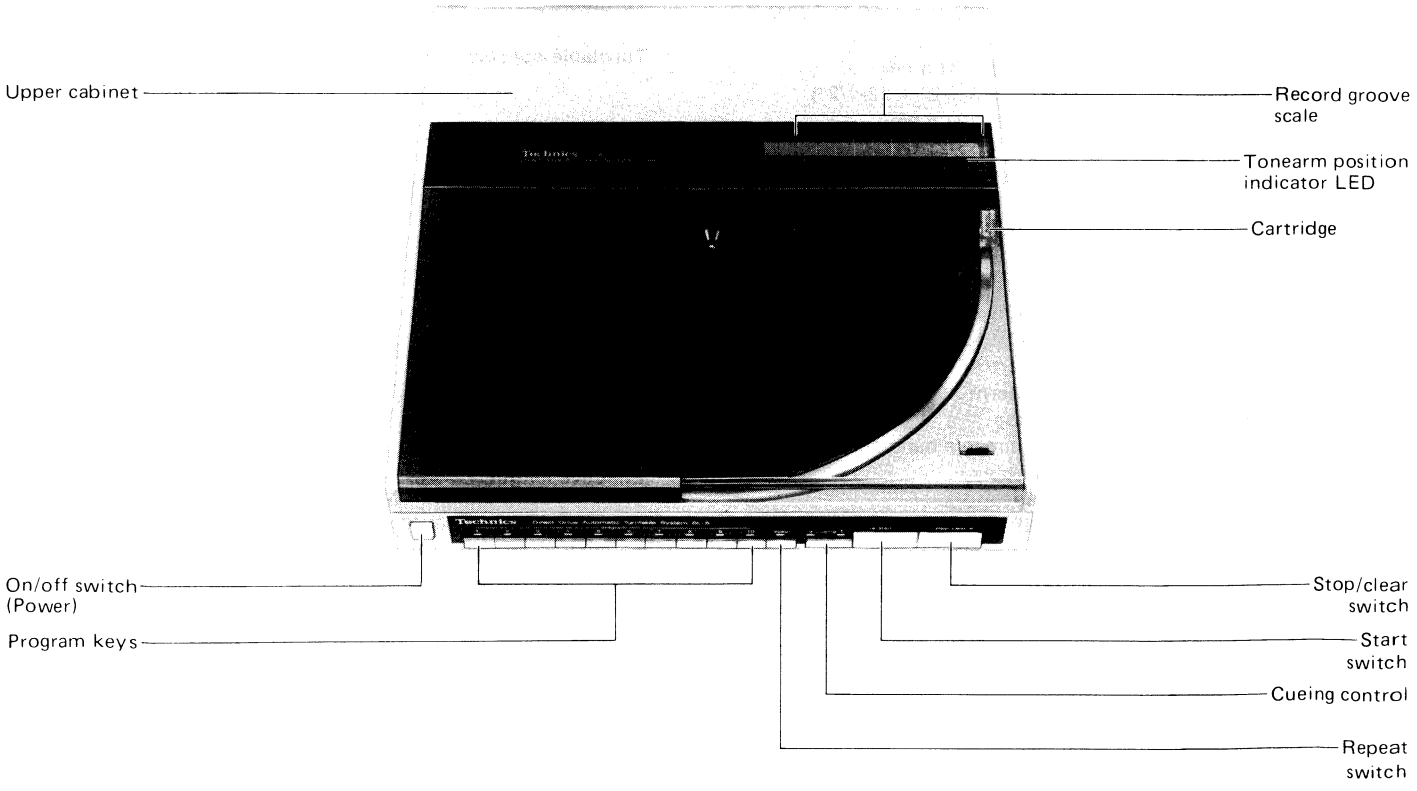
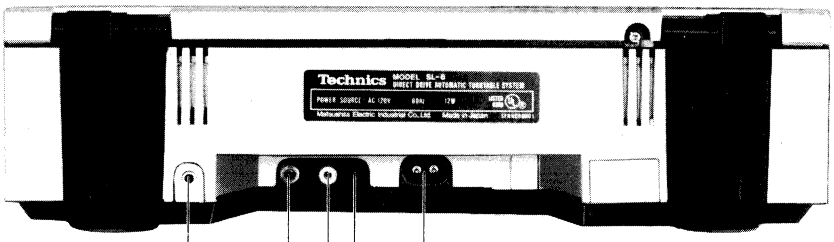
■ LOCATION OF CONTROLS



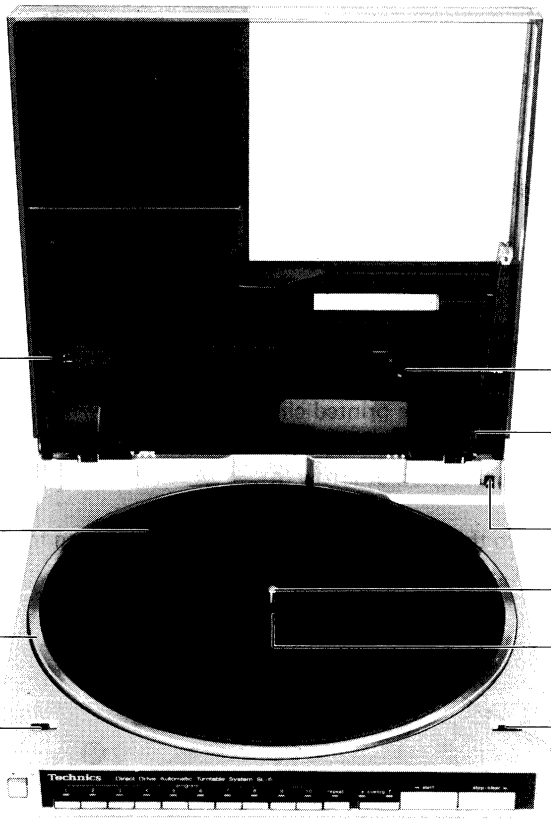


Synchro-rec jack
(Synchro-rec jack is not available)

Phono output terminals
(R)
(L)

AC input socket

Ground



Shutter switch

Stylus cue-down position adjustment screw

Stylus pressure adjustment screw

Turntable mat

Cabinet switch

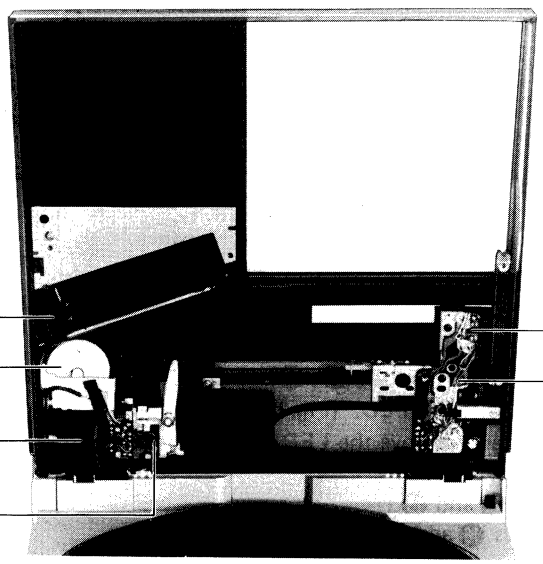
Center spindle

Turntable platter

45-rpm adaptor

Optical sensor sensitivity selector

Speed selector



Blank detecting sensor

Drive gear

Arm motor

Rest switch

Offset sensor

Phono output P.C.B.

■ DISASSEMBLY INSTRUCTIONS

• How to remove the turntable platter

1. Open the upper cabinet.
2. Remove the turntable mat and lift the turntable platter. **(Fig. 1)**

Note:

(1) When removing the turntable platter, it is not necessary to remove the 45 r.p.m. adaptor.

(2) The turntable platter is tight fitted onto the center spindle. When removing the turntable platter, take care not to give damage to the upper cabinet, arm motor cover and tonearm cover.

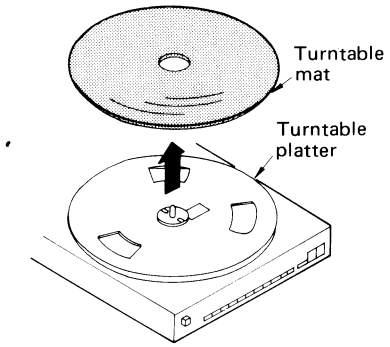


Fig. 1

• How to remove the bottom board

1. Remove the turntable platter.
2. Remove the 4 screws. **(Fig. 2 : ❶ ~ ❹)**

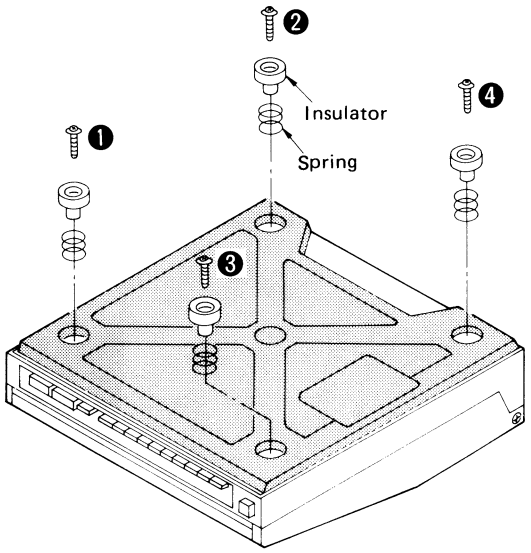


Fig. 2

• How to remove the operation circuit P.C.B.

1. Remove the bottom board.
2. Remove the 7 setscrews **(Fig. 3 : ❺ ~ ⓫)** of the printed circuit board.
3. Separate the optical sensor sensitivity selector switch and speed selector switch from the knobs. **(Fig. 3-A)**
4. Remove the printed circuit board in the direction of arrow Ⓐ.

Note:

The printed circuit board is grounded to the chassis by screw ⓾. When checking for conduction removing the screw ⓾, connect the ground terminal of the P.C.B. to the chassis (stator frame).

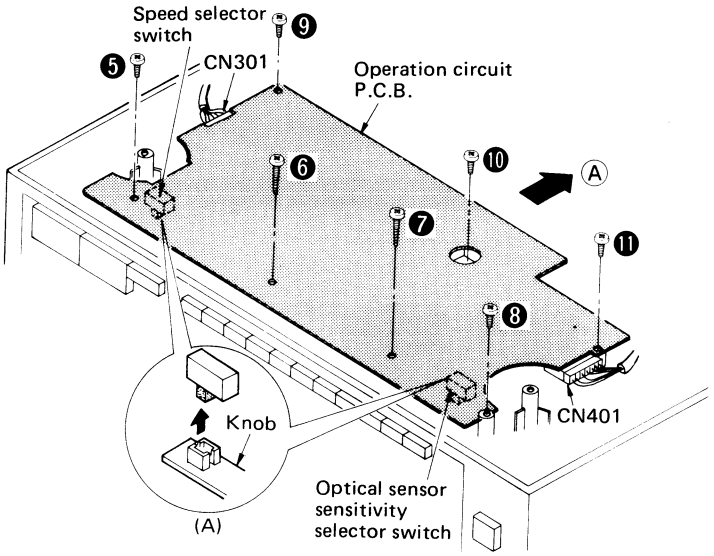


Fig. 3

• How to remove the switches (S301 ~ S312)

(Program keys, repeat and cueing control switches)

1. Remove the operation circuit P.C.B.
2. To remove S301 ~ S305, cut off the 2 clasw **(Fig. 4 : ⓬, ⓭)** of the LED holder. **(Fig. 4-A)**
3. Remove the LED from the holder, and raise the LED. **(Fig. 5)**
4. Release the claw Ⓐ of the LED holder and remove the LED holder from the printed circuit board. **(Fig. 4)**
5. Unsolder to remove the switch terminals.
6. To remove S306 ~ S310, cut off claws ⓮ and ⓯.
7. To remove S311 and S312, cut off claws ⓰ and ⓱.

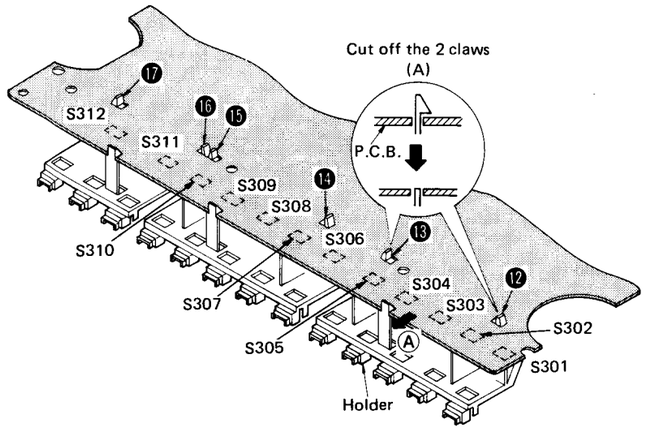


Fig. 4

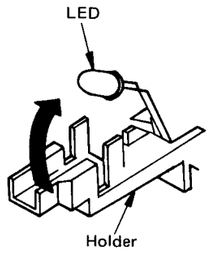


Fig. 5

- **How to remove the drive circuit P.C.B. and stator frame.**

1. Remove the operation circuit P.C.B.
2. Remove the 5 setscrews **(Fig. 6 : ⑱ ~ ㉒)** of the drive circuit P.C.B. and the stator frame.
3. Pull out connector CN201 . Remove the drive circuit P.C.B. and the stator frame can be removed.
4. Remove the 4 setscrews **(Fig. 7 : ㉓ ~ ㉖)** to separate the drive circuit P.C.B. and stator frame.

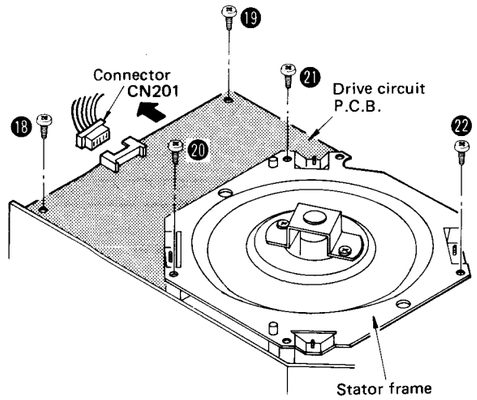


Fig. 6

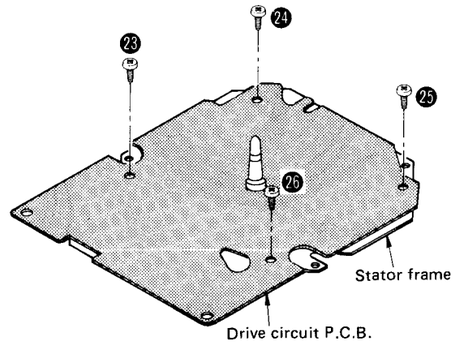


Fig. 7

- **How to remove the arm motor cover**

1. Open the upper cabinet.
2. Remove the 4 screws of the arm motor cover **(Fig. 8 : ㉗ ~ ㉚)** and detach the arm motor cover in the direction of the arrow.

- **How to remove the tonearm cover**

1. Open the upper cabinet.
2. Remove the 3 screws of the tonearm cover **(Fig. 8 : ㉛ ~ ㉝)** and detach the tonearm cover in the direction of the arrow.

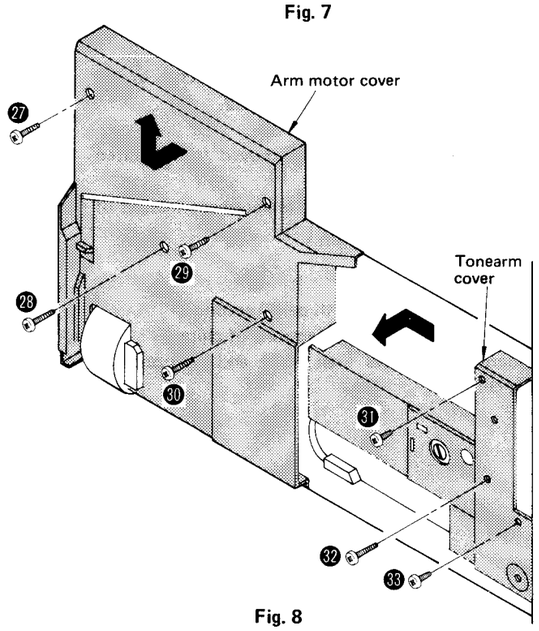


Fig. 8

- **How to remove the dust cover**

1. Open the upper cabinet and arm motor cover.
2. Turn the worm gear by hand to shift the tonearm a little inward.
3. Remove the 3 screws **(Fig. 9 : ㉞ ~ ㊱)** of the dust cover.
4. Remove the 2 setscrews **(Fig. 10 : ㊲ , ㊳)** of the dust cover. Then the dust cover can be removed.

- **How to remove the blank detecting sensor**

1. Open the upper cabinet and remove the arm motor cover.
2. Unsolder the lead wires of the blank detecting sensor.
3. Remove the screw of the guide plate. **(Fig. 9 : ㊴)**
4. Remove the rope fixture of the sensor. **(Fig. 9)**
5. Remove the guide rod fitting clip ㊵ and remove the guide rod. **(Fig. 9)**
6. Pull out the sensor in the direction of the arrow Ⓐ. **(Fig. 9)**

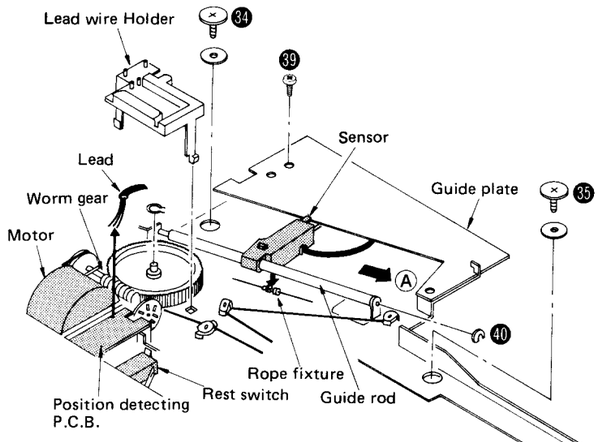


Fig. 9

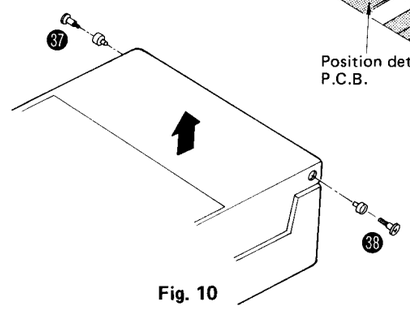


Fig. 10

- **How to remove the upper cabinet (Separation of upper cabinet and lower cabinet)**

1. Remove the bottom board.
2. Unsolder the ground lead wire of the output terminal and remove the output terminal from the lower cabinet.
3. Pull out the 2 connectors (CN301, CN401) of the operation circuit P.C.B.
4. Remove the 4 screws **(Fig. 11, 12 : ㊶ ~ ㊹)** of the hinge.
5. The hinge claws are engaged with the lower cabinet. Release the claws and slowly lift the lower cabinet to separate it from the upper cabinet.

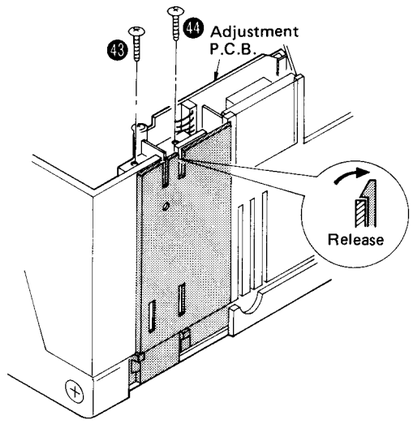


Fig. 12

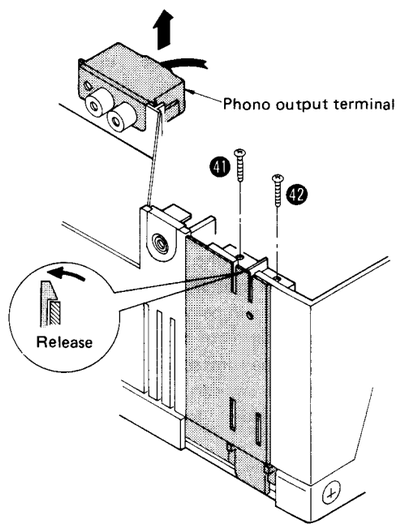


Fig. 11

- **How to remove the tonearm**

1. Remove the dust cover and tonearm cover.
2. Turn the worm gear by hand to move the tonearm inward.
3. Unsolder the 5 lead wires of the cartridge. **(Fig. 13)**
4. Remove the screw of the tonearm. **(Fig. 14 : 45)**

- **How to remove the cueing control ass'y**

1. Remove the tonearm cover.
2. Unsolder the 2 lead wires of the cueing plunger. **(Fig. 13)**
3. Remove the 2 screws **(Fig. 13 : 46, 47)** of the cueing control ass'y, and remove the ass'y in the direction of arrow **A**.

- **How to remove the tonearm position indicator board**

1. Remove the tonearm cover.
2. Unsolder the 2 lead wires of the indicator. **(Fig. 13)**
3. Remove the screw of the tonearm position indicator board. **(Fig. 13 : 48)**

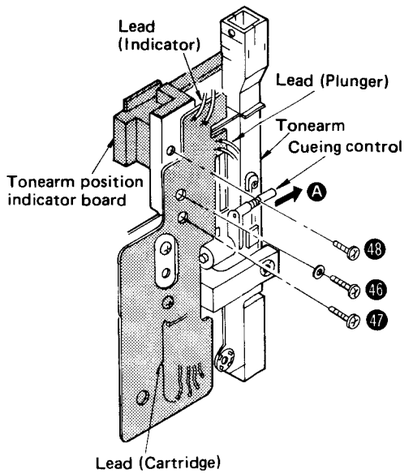


Fig. 13

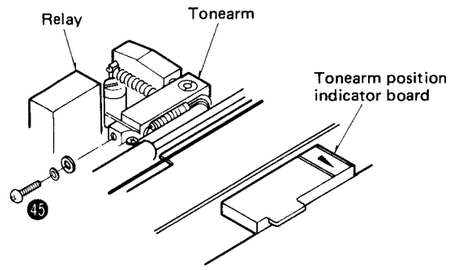


Fig. 14

- **How to remove the Hall element**

1. Remove the turntable platter.
2. Remove the terminal solder by use of solder sucker.
3. Hold the Hall element with a tweezers and remove it while touching the soldering iron to the terminal. **(Fig. 15)**

Note: Fit the Hall element with the part No. print up. The reverse in terminal position is allowable provided that the printed side is up.

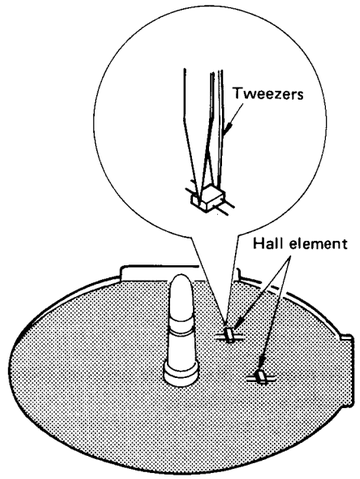


Fig. 15

- **How to remove the 45 rpm adaptor**

1. Remove the turntable platter.
2. The adaptor claw catches the turntable plater. Remove the adaptor by pusing it in the direction of the arrow. **(Fig. 16)**

Note: When removing the adaptor, be sure to remove the turntable platter beforechand, Otherwise, the adaptor claw will be broken.

* The turntable platter of this unit is greased. **(Fig. 17)** After replacing the turntable platter or when the adaptor operation is not smooth, apply grease to the platter. (It is recommended to use Grease 3 of Kit No. SZZE1003C.)

Note: Do not apply grease to parts other than those specified (outside surfaces of adaptor in particular). Alos, apply a proper amount of grease so that it will not run into the set.

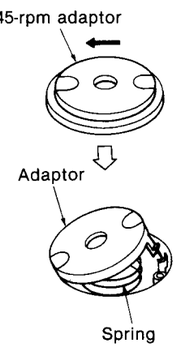


Fig. 16

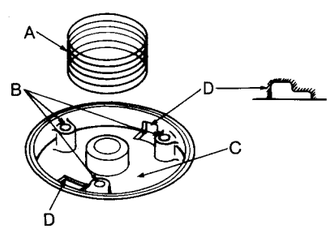


Fig. 17

A: Side of spring
B: Bosses (3 portions) of turntable platter
C: Bottom of turntable platter
D: Notches (2 portions) of turntable platter

■ HOW TO SET THE TONEARM DRIVE ROPE

Set the rope according the following procedure.

1. Remove the dust cover. **(Refer to "How to remove the dust cover".)**
2. Remove the lead wire holder. **(See Fig. 18)**
3. Remove the C-ring of the arm drive wheel and remove the drive wheel. **(See Fig. 18 : 49)**
4. Turn over the arm drive wheel, and set the rope in the order of 1 ~ 2. **(Fig. 19)**
5. Holding the rope with the hand, set the drive wheel and rope in the order of 3 ~ 8 of **Fig. 20.**
6. After setting the rope, match in tonearm and sensor with the position of rope fixture, and secure the parts.
7. Turn the worm gear by hand to see that the tonearm and sensor move, then set the C-ring.

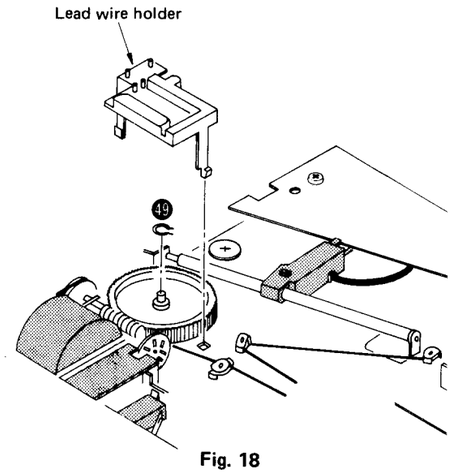


Fig. 18

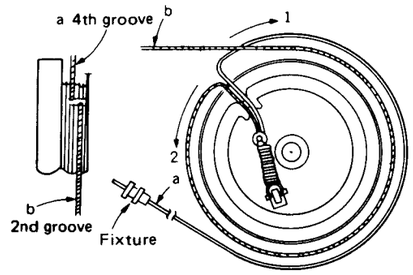


Fig. 19

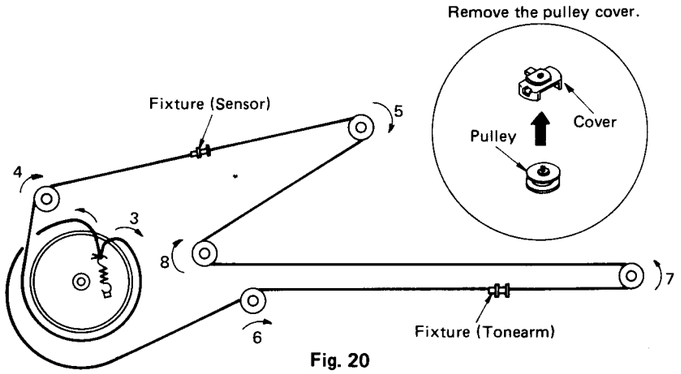


Fig. 20

■ HOW TO REPLACE CHIP (RESISTOR)

1. Unsolder from chip by using solder sucker.
2. Remove chip with tweezers by rotating it while removing solder as shown in **Fig. 21.**
3. Solder circuit board first and then solder chip in the direction of the arrow as shown in **Fig. 22.**

Notes:

1. Do not use chip again which is removed from printed circuit board.
2. Use lead wire with insulator for replacement instead of chip jumper.

- **Note for replacing chips**

1. Do not heat chips more than three (3) seconds.
2. Be careful not to damage the electrode of chips.
3. Use soldering iron (less than 60W) and tweezers for replacing chips.

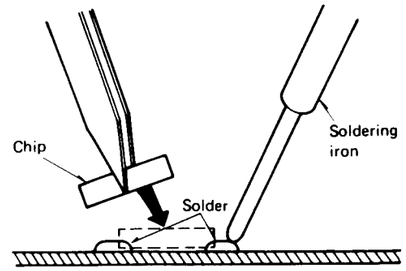


Fig. 21

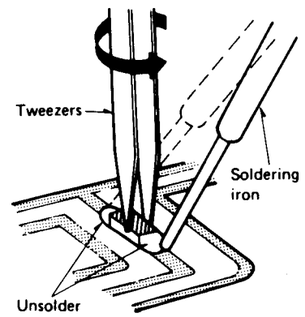


Fig. 22

■ CHECKING METHOD OF THE UNIT

1. How to use the repair table (Fig. 23)

① Remove the bottom board.
② Remove the operation circuit P.C.B. and connect the P.C.B. ground terminal to the chassis (Stator frame).
③ Put the set on the repair table.
④ Fit the turntable platter and put on the turntable mat.
⑤ Put on the record and check the circuits from under the set.

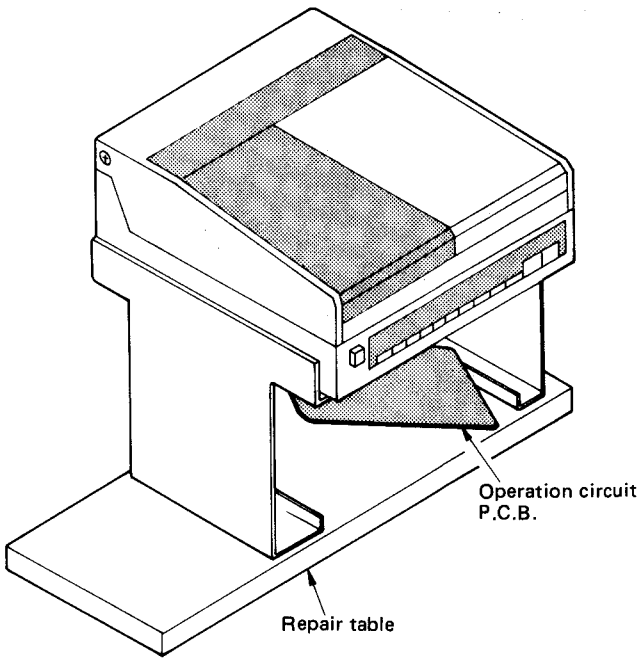


Fig. 23

2. How to raise the set (Fig. 24)

Note: Turntable platter is not fixed on the center spindle. Take care so that the turntable platter will not come loose. Also, take care allow the set to fall down.

① Remove the bottom board.
② Completely open the upper cabinet.
③ Hold the cabinet switch with tape.
④ Fit the turntable platter.
⑤ Raise the set and check the circuits.

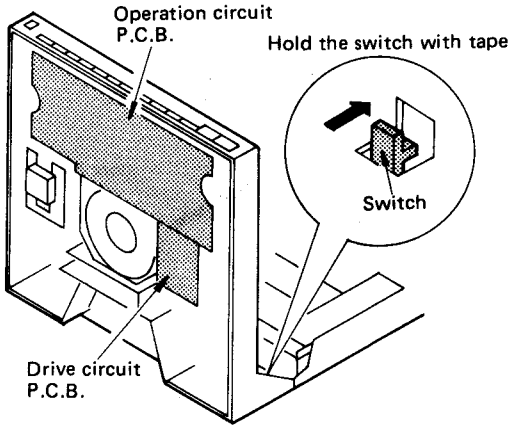


Fig. 24

3. How to turn over the set (Fig. 25)

Note: This purpose is to check the voltage of each circuit during stop of the turntable.

① Remove the turntable platter and turn over the set.
② Remove the bottom board.
③ Turn the power switch "on" and check the voltage.

Note: Do not push other switches.
[If the unit is operated under no-load condition (with turntable removed) for a long period of time, the drive IC will be damaged.]

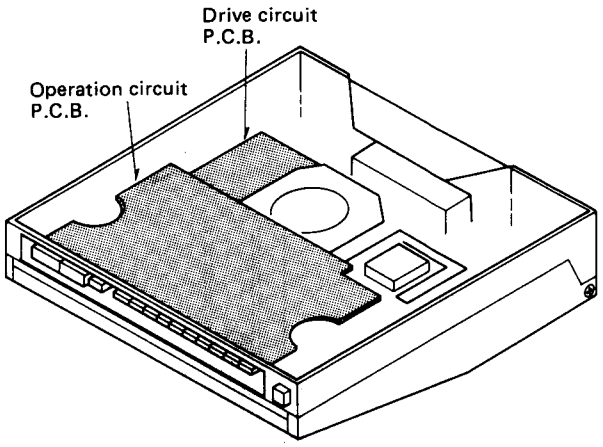


Fig. 25

■ MEASUREMENTS AND ADJUSTMENT

• Adjustment points

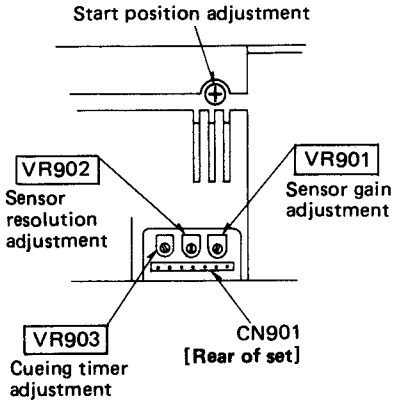
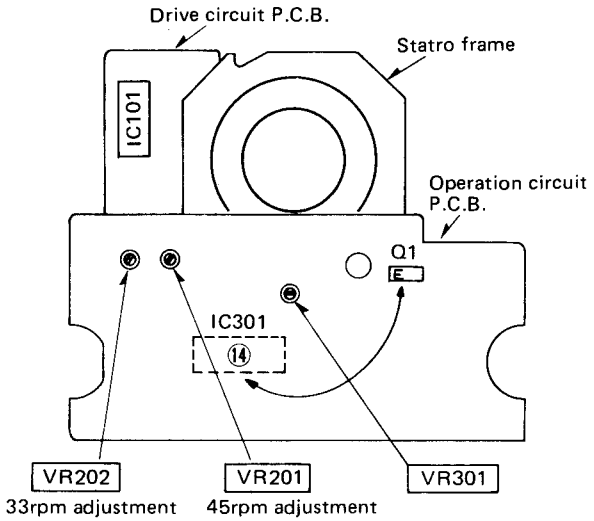


Fig. 26



* Connect between Q1 (E) and IC301 ⑭ pin for clock frequency adjustments.

Fig. 27

Fig. 28

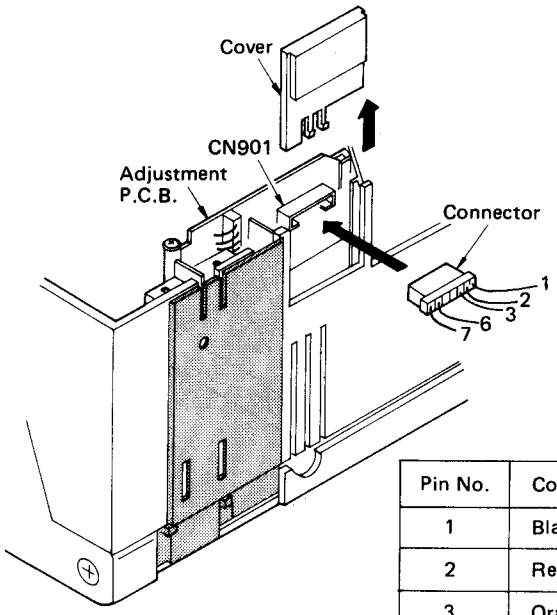


Fig. 29

Pin No.	Color	Description
1	Black	Ground
2	Red	Muting signal
3	Orange	Cueing signal
6	Blue	Sensor amp. output signal
7	Violet	Filter amp. output signal

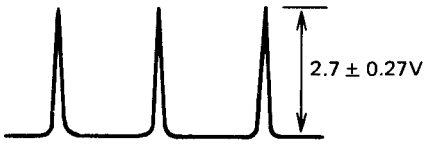


Fig. 30

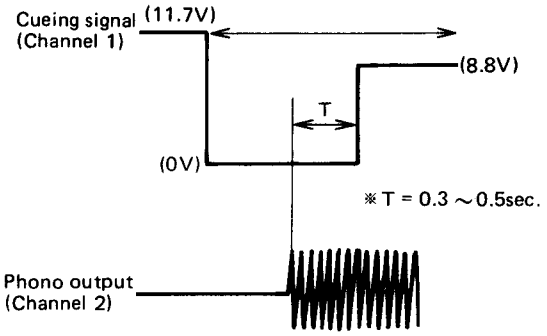


Fig. 31

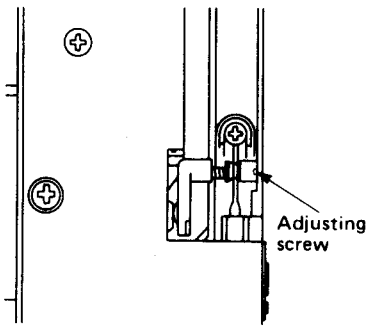


Fig. 33

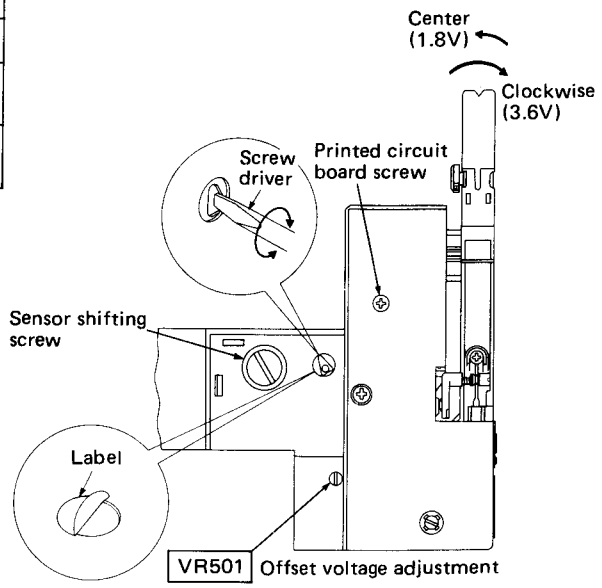


Fig. 32

• Equipment used and condition of the set

1. Oscilloscope (two channels)
2. DC voltmeter.
3. Record (SFTR007) for adjustment.
4. Connector for adjustment.
5. Remove the bottom board and remove the cover. **(Fig. 29)**
6. Set the optical sensor sensitivity selector to "M".

Step	Item	Preparations for adjustment	Adjusting portion	Adjusting method
1	**Start position**	1. Open the upper cabinet and put on the test record. 2. Turn the power switch on. 3. Push the "Start" switch.	Descending position adjusting screw. (Fig. 26)	1. Turn the descending position adjusting screw. If it descends between tunes, turn the screw clockwise. If it descends outside the disc, turn the screw counterclockwise.
2	**Clock frequency**	1. Connect Q1 emitter to IC301 14-pin. (Fig. 27) 2. Connect the oscilloscope to IC301 13-pin.	VR301 (Fig. 27)	1. Turn the power switch on. 2. Adjust VR301 so that the cycle of output waveform is 40μs ± 2μs. (Fig. 28)
3	**Sensor gain**	1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 29) 2. Connect the oscilloscope to 6-pin (+) and 1-pin (–). 3. Play side A of the test record.	VR901 (Fig. 26)	1. Turn the power switch on and move the tonearm to the blank area of the record. 2. Adjust VR901 so that the output voltage is 4V ± 0.4V.
4	**Sensor resolution**	1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 29) 2. Connect the oscilloscope to 7-pin (+) and 1-pin (–). 3. Play side A of the test record.	VR902 (Fig. 26)	1. Turn the power switch on. 2. Push the program key to let it search the tonearm. (Output is delivered between the tunes.) 3. Adjust VR902 so that the peak output between tunes is 2.7V ± 0.27V. (Fig. 30)
5	**Cueing timer**	1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 29) 2. Connect the unit to the amplifier. (Phono output) 3. Connect 3-pin (+) and 1-pin (--) to the channel (1) of two channel oscilloscope. 4. Connect the speaker terminal of amplifier to the channel (2) of two channel oscilloscope. 5. Connect the 2-pin and 1-pin. (Muting operation stops.) 6. Play side B of the test record.	VR903 (Fig. 26)	1. Turn the power switch on. 2. Move the tonearm to a recorded (groove) part of the record, and push the cueing switch for cueing down. 3. Check the time until completion of cueing (rise of cueing signal) after the stylus touches the record surfase. 4. Adjust VR903 so that the time until completion of cueing is 0.3 ~ 0.5 sec. (Fig. 31) Note: Set the sweep time of oscilloscope to 0.2 sec/cm or 0.5 sec/cm. For example, in the case of 0.2 sec/cm range, adjust it so that the cueing completion signal is delivered 2 scale (0.4 sec) later than delivery of phono output signal.
6	**Descending between tunes**	1. Open the upper cabinet and hold the cabinet switch with tape. 2. Play side B of the tesr record. 3. Close the upper cabinet. 4. Connect the unit to the amplifier. (Connect the speakers to the speaker terminals.)	Sensor shifting screw (Fig. 32)	1. Turn the power switch on. 2. Push the program key 2, followed by start switch. 3. After completion of cueing down, push the program key 2 for the purpose of skipping. 4. Make sure that descending position is at count "20 ~ 21". 5. If the descending position is wrong, open the upper cabinet and turn the sensor shifting screw. 6. Close the upper cabinet and push the program key 2. 7. Adjust so that the descending position is at count "20 ~ 21". Repeat steps 4 ~ 7.
7	**Tonearm offset angle**	1. Open the upper cabinet and hold the cabinet switch with tape. 2. Close the upper cabinet.	Adjusting screw (Fig. 33)	1. Turn the power switch on and push the start switch to shift the tonearm inward. 2. Open the upper cabinet. 3. Turn the adjusting screw so that the arm center matches the V-groove of the lift bar.

Step	Item	Preparations for adjustment	Adjusting portion	Adjusting method
8	**Servo gain and offset voltage**	1. Open the upper cabinet and hold the cabinet switch with the tape. 2. Close the upper cabinet. 3. Connect the DC voltmeter to CN301 terminal 3 and ground terminal. 4. Remove the Label of the tonearm cover.	VR501 (Servo gain) P.C.B. (Offset voltage) (Fig. 32)	1. Turn the power switch on and push the start switch to shift the tonearm inward. 2. Open the upper cabinet. 3. Completely shift the tonearm to the right. Then, adjust VR501 so than the voltage is 3.6V. **(Servo gain)** 4. Set the tonearm to the center and make sure that the output voltage is 1.8V. 5. If the voltage is not 1.8V, loosen the printed circuit board screw and move the board to the right or left with a screwdriver so that the output voltage becomes 1.8V. After the adjustment, tighten the printed circuit board screw. **(Offset adjustment)**
9	**Rotation speed**	1. Open the upper cabinet and put on the record.	VR201 (45 rpm) VR202 (33 rpm)	1. Turn the power switch on. 2. Set the speed selector switch to 45 rpm. 3. Turn VR201 to adjust the speed to the rated speed (45 rpm). 4. Set the speed selector switch to 33 rpm. 5. Turn VR202 to adjust the speed to the rated speed (33-1/3 rpm). **Note: Be sure to adjust 45 rpm. first.**

■ REPLACEMENT PARTS LIST...Electric Parts

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. This "**S**" mark is service standard parts and may differ from production parts.
4. Unless otherwise specified.
All resistors are in OHMS (Ω) K = 1000Ω, M = 1000kΩ
All capacitors are in MICROFARADS (μF) P = μμF
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Areas

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EG] is available in F.R. Germany.
* [EB] is available in Belgium.
* [EF] is available in France.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [EH] is available in Holland.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.
* [XM] is available in Central South America.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC1	AN7812	Regulator
IC101	AN6636	Drive
IC201	AN6552	FG Amplifier & Constant Voltage (Hall Element)
IC301	MN1425FPE	Micro Computer
IC401	AN6552	Arm Motor Control
IC801	AN6562	DC amplifier & Band Pass Filter
IC802	AN6912	Comparator
TRANSISTORS		
Q1	2SC1383NC	Regulator
Q301	2SD636	Speed Select
Q302	2SD636	Muting Relay Drive
Q303	2SD636	Cueing Drive
Q304	2SD892	Cueing Drive
Q305	2SB641	Switching
Q306	2SD636	Converter
Q308, 309	2SB641	Waveform Shaping
Q310	2SB641	Speed Select
Q311	2SD636	Start/Stop Select
Q312	2SD636	Switching
Q401, 402	2SD592	Arm Motor Control
Q403, 404	2SD638	Arm Motor Control
Q801	2SB641	Biass
DIODES		
D1 ⚠	SVDS1RBA20F	Rectifier
D2 **S**	MA1056	5.6V Zener
D301 ~ 311	SVDPR5704SF	Light Emitting Diode
D312 ~ 317	MA162A	Switching
D319 **S**	RVDRD7R5FB	7.5V, Zener
D320	SVDPR5704SF	Light Emitting Diode
D321	SVDPG5724SYF	Light Emitting Diode
D501 **S**	MA162A	
D502 **S**	MA162A	
D503	SVDPR3432S	Light Emitting Diode
D801, 802 **S**	MA162A	Slice & Integration
D803	MA1047TA	4.7V, Zener
D804, 805 **S**	MA162A	Biass
D806 **S**	RVDRD7R5FB	7.5V, Zener
SWITCHES		
S1 ⚠	SFDSC05N08	Power
S301 ~ 314	EVQQSH03B	Program, Reset, Cueing, Start & Stop
S315	SFDSHSW0699	Speed Selector
S601	SFDSD2MSL-C	Rest
S701	SFDSC05N01	Cabinet
S801	SFDSHSW0699	Gain Selector
S901 [XA, XM] ⚠ only	SFDSHXW225-2	Switch, Voltage Adjuster

Ref. No.	Part No.	Description
VARIABLE RESISTORS		
VR201, 202	EVTS3MA00B54	Speed Adj., 50kΩ (B)
VR301	EVNK6AA00B54	Clock Frequency Adj. 50kΩ (B)
VR501	EVNK6AA00B54	Servo Gain Adj., 50kΩ (B)
VR901	EVNK6AA00B15	Gain Adj., 100kΩ (B)
VR902	EVNK6AA00B15	Detecting Sensitivity Adj., 100kΩ (B)
VR903	EVNK6AA00B24	Cueing Timer Adj., 20kΩ (B)

Ref. No.	Part No.	Description
COMPONENT COMBINATION		
Z301	EXBT44471K	470Ω x 4
Z302	EXBRB7471K	470Ω x 7
Z303	EXBP84333K	33kΩ x 4
Z304	EXBP84103K	10kΩ x 4
Z305	EXBP84332K	3.3kΩ x 4
PHOTO INTERRUPTERS		
PC501	ON1186	Arm Position
PC601	ON1161	Offset Angle
PC701	ON2159	Blank Grovve
RELAY		
RL501	SFDYQ11N01	Muting

Ref. No.	Part No.	Description
HALL ELEMENT		
H1, 2	OH–002	Turntable Posistor Detector
POWER TRANSFORMER		
T1 [XA] ⚠	SLT57DT7E	Power Source
T1 [EK, XL] ⚠	SLT48DTE13E	Power Source
T1 [Other Areas] ⚠	SLT48DT10E	Power Source
FUSE		
F1 [XA] ⚠	XBA2C02T1B	T 200mA, 250V
F1 [Other Areas] ⚠	XBA2C06T1B	T 630mA, 250V
F2 [XA] ⚠	XBA2C06T1B	T 630mA, 250V

Ref. No.		Part No.	Value
RESISTORS			
R1	S	ERD25FJ101	100
R2	S	ERD25FJ101	100
R3	S	ERG2ANJ270	27
R4	S	ERD25FJ221	220
R101		ERD10TLJ270U	27
R102	S	ERX1ANJ2R7	2.7
R105		ERD10TLJ153U	15K
R106		ERD10TLJ223U	22K
R201		ERD10TLJ102U	1K
R202		ERD10TLJ153U	15K
R203		ERD10TLJ333U	33K
R204		ERD10TLJ104U	100K
R205		ERD10TLJ683U	68K
R206		ERO10MKG1913	191K
R207		ERO10MKG5622	56.2K
R221		ERD10TLJ102U	1K
R222		ERD10TLJ153U	15K
R320	S	ERD25TJ333	33K
R321	S	ERD25FJ471	470
R322	S	ERD25FJ102	1K
R323	S	ERD25FJ103	10K
R324, 325	S	ERD25FJ472	4.7K
R326, 327	S	ERD25FJ152	1.5K
R328	S	ERD25FJ472	4.7K
R329	S	ERD25FJ392	3.9K
R330	S	ERD25FJ103	10K
R331	S	ERD25FJ472	4.7K
R334, 335	S	ERD25FJ331	330
R336	S	ERD25FJ103	10K
R337	S	ERD25TJ223	22K
R338	S	ERD25FJ272	2.7K
R341	S	ERD25TJ563	56K
R343	S	ERD25FJ103	10K
R345	S	ERD25FJ472	4.7K
R346	S	ERD25TJ333	33K
R347	S	ERD25TJ563	56K
R348	S	ERD25FJ103	10K
R349	S	ERD25FJ471	470
R350	S	ERD25FJ472	4.7K
R351	S	ERD25FJ471	470
R352, 353	S	ERD25FJ222	2.2K
R354	S	ERD25TJ223	22K
R355	S	ERD25FJ103	10K
R356	S	ERD25FJ152	1.5K
R357	S	ERD25TJ223	22K
R358	S	ERD25TJ333	33K
R359	S	ERD25FJ561	560
R401	S	ERD25TJ683	68K
R402	S	ERD25FJ222	2.2K
R403	S	ERD25FJ102	1K
R404	S	ERD25TJ224	220K
R405	S	ERD25TJ683	68K
R406	S	ERD25FJ222	2.2K
R407	S	ERD25FJ102	1K
R408	S	ERD25TJ224	220K
R409	S	ERD25TJ273	27K
R410	S	ERD25FJ103	10K
R413	⚠ S	ERD2FCG180	18
R501	S	ERD25FJ561	560
R502	S	ERD25FJ391	390
R601	S	ERD25FJ681	680
R801	S	ERD25TJ154	150K
R802	S	ERD25FJ472	4.7K
R803	S	ERD25TJ154	150K
R805	S	ERD25FJ222	2.2K
R806	S	ERD25FJ472	4.7K
R807	S	ERD25FJ332	3.3K
R808	S	ERD25FJ682	6.8K
R809	S	ERD25FJ102	1K
R810	S	ERD25FJ103	10K
R811	S	ERD25TJ684	680K
R812	S	ERD25TJ223	22K
R813	S	ERD25TJ104	100K
R814	S	ERD25TJ684	680K
R815	S	ERD25TJ224	220K
R816	S	ERD25FJ221	220
R817	S	ERD25TJ104	100K
R818	S	ERD25FJ102	1K
R820	S	ERD25FJ222	2.2K
R821	S	ERD25FJ272	2.7K
R822	S	ERD25FJ220	22
R823	S	ERD25FJ103	10K
R825	S	ERD25FJ101	100
R826	S	ERD25TJ223	22K
R828	S	ERD25TJ223	22K
R829	S	ERD25FJ682	6.8K
CAPACITORS			
C1	⚠ S	ECQM1223KZ	0.022
C2, 3	⚠ S	ECKD1H223PF	0.022
C4	S	ECEB1VS222	2200
C5	S	ECEA1CS330	33
C101		ECUV1E333KBM	0.033
C102, 103	S	ECEA1CN470S	47
C104	S	ECEA1CS101	100
C105	S	ECEA1CS330	33
C201	S	ECEA1HS3R3	3.3
C202	S	ECQM1H104KV	0.1
C203	S	ECQM1H333KV	0.033
C205		ECUV1E473KBM	0.047
C206	S	ECQM1H104JV	0.1
C207	S	ECQM1H104KV	0.1
C208	S	ECEA1ES4R7	4.7
C209	S	ECQM1H104KV	0.1
C210	S	ECEA1HSR22	0.22
C212, 213		ECUV1H102MBM	0.001
C301	S	ECCD1H680K	68P
C302	S	ECQM1H104KV	0.1
C303	S	ECKF1E104ZVD	0.1
C304	S	ECEA0JS330	33
C305	S	ECKD1H223PF	0.022
C306	S	ECKD1H102KB	0.001
C401, 402	S	ECQM1H223KZ	0.022
C403		ECQV05224JZ	0.22
C501	S	ECEA1CS101	100
C601	S	ECFB1B104ZRM	0.1
C801	S	ECQM1H103KV	0.01
C802, 803	S	ECQM1H104KV	0.1
C804	S	ECEA1CS220	22
C805	S	ECEA1CS470	47
C806	S	ECQM1H473KV	0.047

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERX	2	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor Type			Wattage			Tolerance		
ERD	:	Carbon	10	:	1/8W	J	:	± 5%
ERX	:	Metal Film	25	:	1/4W	G	:	± 2%
ERO	:	Metal Film	1	:	1W			

ERD10TLJ□□□ ⟶ Chip type carbon
ERO10MKG□□□ ⟶ Chip type metal film
ECUV1H□□□ ⟶ Chip type ceramic

Numbering System of Capacitor

Example

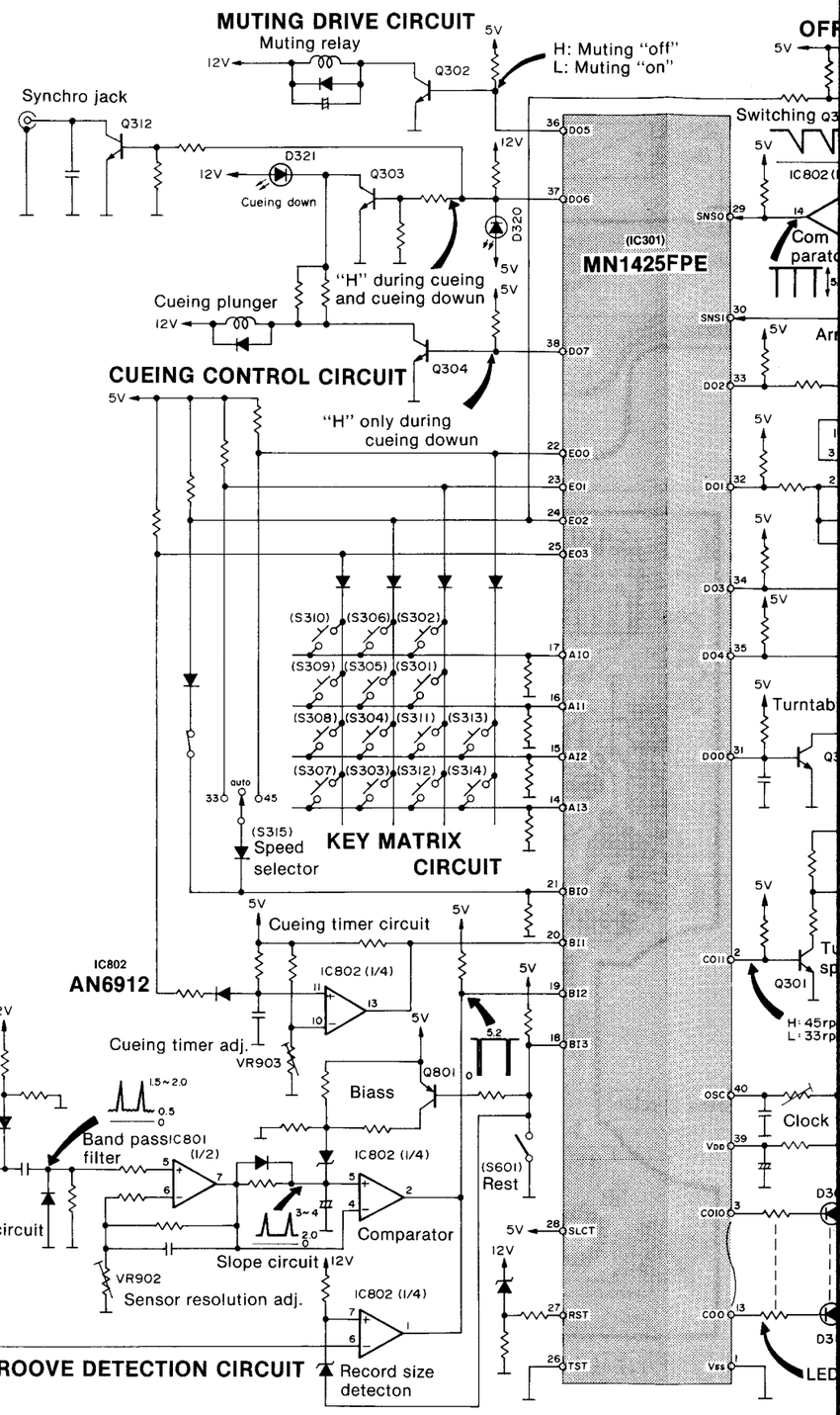
ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type			Voltage: ECEA Type		Voltage: Others		Tolerance		
ECEA	:	Electrolytic	0J	: 6.3V	1H	: 50V DC	J	:	± 5%
ECEA...N	:	Non Polar Electrolytic	1A	: 10V	2H	: 500V DC	K	:	± 10%
ECKD	:	Ceramic	1C	: 16V			Z	:	+80%, −20%
ECQM	:	Polyester	1E	: 25V			P	:	+100%, −0%
ECEB	:	Electrolytic	1H	: 50V			M	:	± 20%
ECUV	:	Ceramic	1J	: 63V					
ECKF	:	Ceramic	50	: 50V					
			25	: 25V					

■ BLOCK DIAGRAM

• Description of each terminal of MN1425FPE

Pin No.	Symbol	Description
1.	VSS	Ground terminal
2	CO11	Turntable speed select output terminal (45 rpm at "H", 33 rpm at "L".)
3	CO10	Program LED display output terminal (LED ON at "L")
4	CO9	
5	CO8	
6	CO7	
7	CO6	
8	CO5	
9	CO4	
10	CO3	
11	CO2	
12	CO1	
13	CO0	Repeat LED display output terminal (LED ON at "L")
14	AI3	Key scan input terminal (Each key is read in through key scan with E-port.)
15	AI2	
16	AI1	
17	AI0	
18	BI3	Rest position detection input terminal ("L" when tonearm is on rest.)
19	BI2	Blank groove detection and record detection terminal [Blank groove detection pulse is active "L". When it is "H" at start, 30cm record is detected. When it is "L", it is judged that there is no 30cm record (17cm or 25cm record is present)]
20	BI1	Cueing time read input terminal.
21	BI0	Turntable speed select and cabinet opening/closing detection terminal. (Each operation is done through key scan with E-port.)
22	EO0	Key scan output terminal (Each key-is read in through key scan with A-port).
23	EO1	
24	EO2	
25	EO3	
26	TST	Test terminal (connected to Ground not used)
27	RST	Reset terminal (The microcomputer is reset at "L", and is not reset at "H".)
28	SLCT	Select terminal (The level is set to "H" by the select terminal of the inside counter.)
29	SNSO	Offset angle detection signal input terminal
30	SNSI	Arm position detection signal input terminal
31	DO0	Turntable start/stop select terminal (Start at "L", stop at "H".)
32	DO1	Arm motor drive control terminal
33	DO2	
34	DO3	
35	DO4	
36	DO5	Muting control terminal
37	DO6	Cueing control terminal ("H" during cueing and cueing down.)
38	DO7	Cueing control terminal ("H" only during cueing down.)
39	VDD	Power supply terminal
40	OSC	Oscillation terminal



t No.	Description
02	Turntable Posistor Detector
ER	
DT7E	Power Source
DTE13E	Power Source
DT10E	Power Source
02T1B	T 200mA, 250V
06T1B	T 630mA, 250V
06T1B	T 630mA, 250V

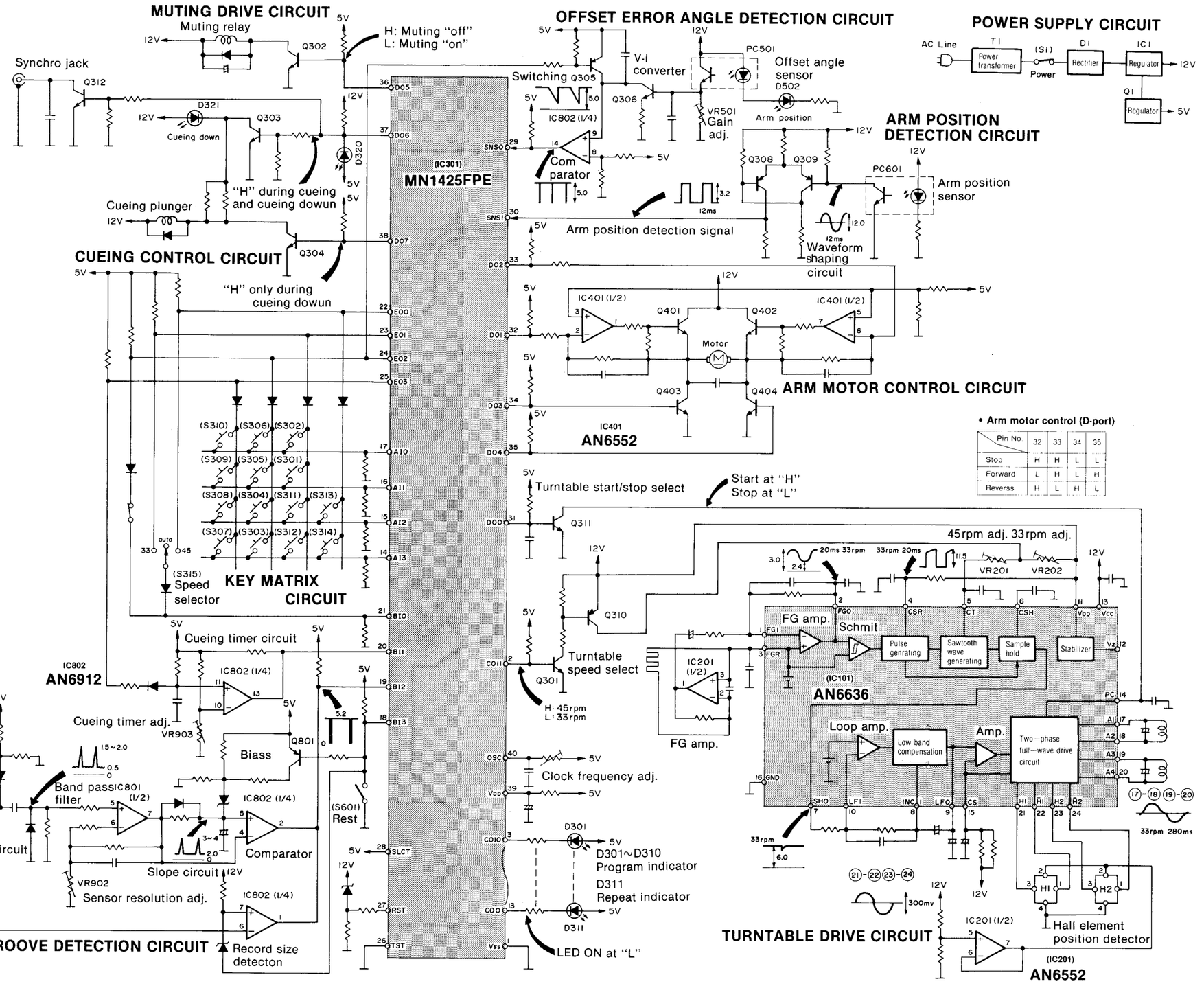
	Part No.	Value
S	ECEA1CS101	100
S	ECEA1CS330	33
S	ECEA1HS3R3	3.3
S	ECQM1H104KV	0.1
S	ECQM1H333KV	0.033
	ECUV1E473KBM	0.047
S	ECQM1H104JV	0.1
S	ECQM1H104KV	0.1
S	ECEA1ES4R7	4.7
S	ECQM1H104KV	0.1
S	ECEA1HSR22	0.22
	ECUV1H102MBM	0.001
S	ECCD1H680K	68P
S	ECQM1H104KV	0.1
S	ECKF1E104ZVD	0.1
S	ECEA0JS330	33
S	ECKD1H223PF	0.022
S	ECKD1H102KB	0.001
S	ECQM1H223KZ	0.022
	ECQV05224JZ	0.22
S	ECEA1CS101	100
S	ECFB1B104ZRM	0.1
S	ECQM1H103KV	0.01
S	ECQM1H104KV	0.1
S	ECEA1CS220	22
S	ECEA1CS470	47
S	ECQM1H473KV	0.047

	Tolerance
	J : ± 5%
	K : ± 10%
	Z : +80%, −20%
	P : +100%, −0%
	M : ± 20%

■ BLOCK DIAGRAM

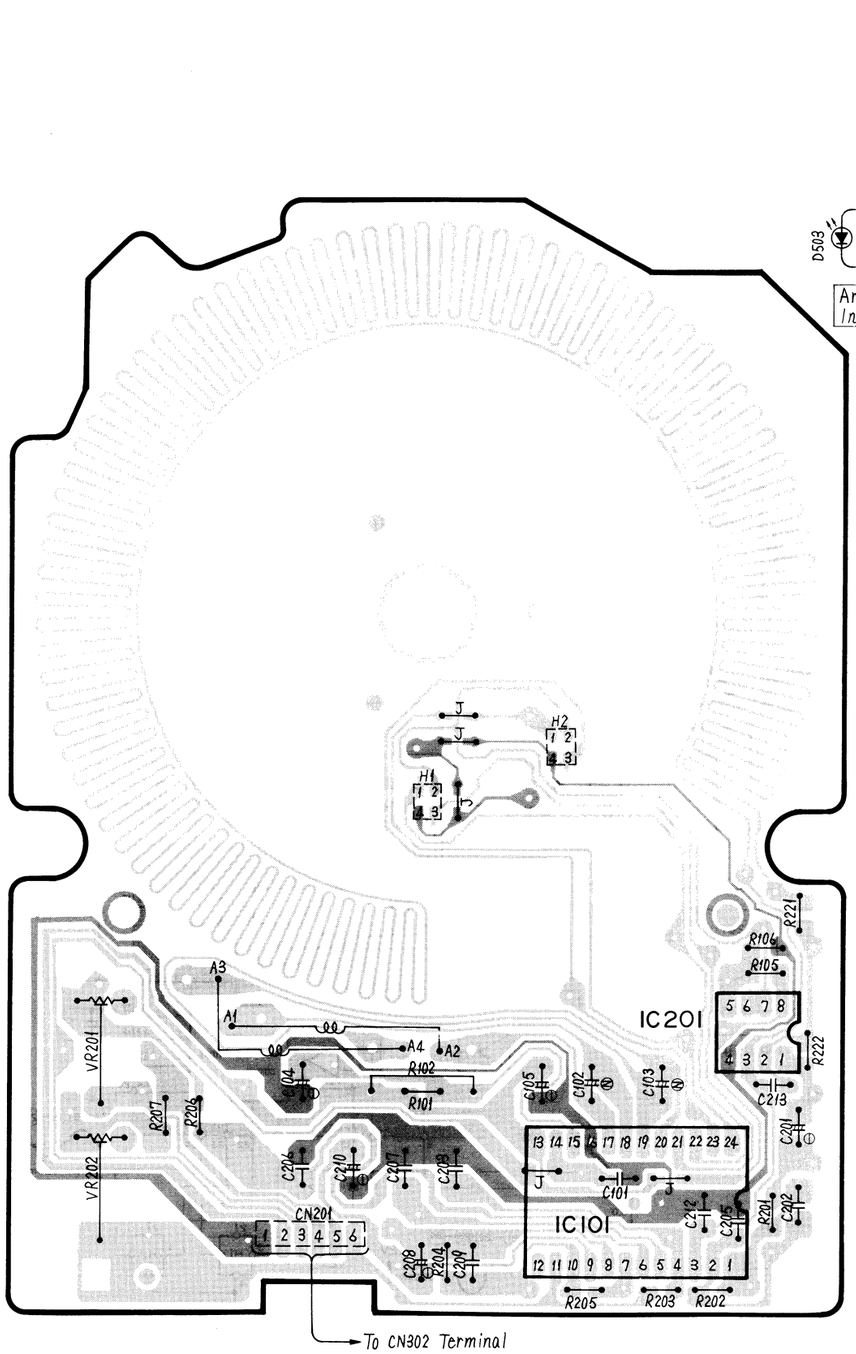
• Description of each terminal of MN1425FPE

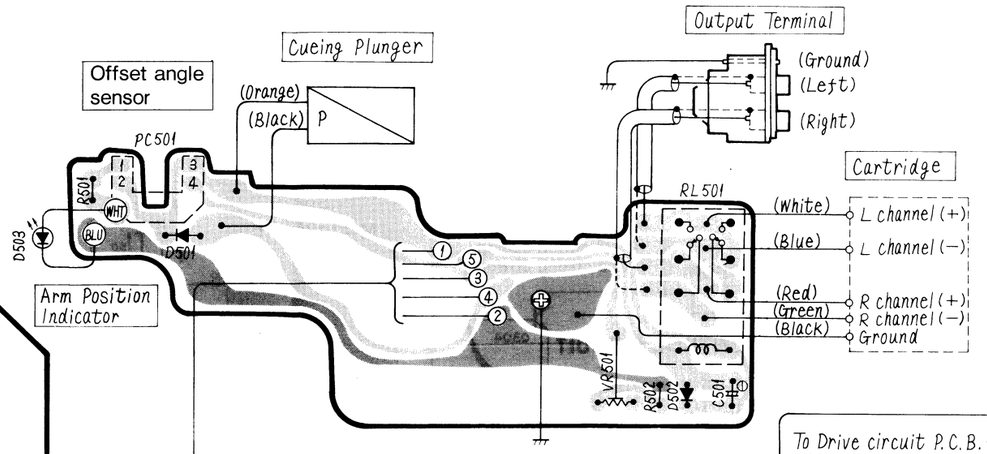
Pin No.	Symbol	Description
1.	VSS	Ground terminal
2	CO11	Turntable speed select output terminal (45 rpm at "H", 33 rpm at "L".)
3	CO10	Program LED display output terminal (LED ON at "L")
4	CO9	
5	CO8	
6	CO7	
7	CO6	
8	CO5	
9	CO4	
10	CO3	
11	CO2	
12	CO1	
13	CO0	Repeat LED display output terminal (LED ON at "L")
14	AI3	Key scan input terminal (Each key is read in through key scan with E-port.)
15	AI2	
16	AI1	
17	AI0	
18	BI3	Rest position detection input terminal ("L" when tonearm is on rest.)
19	BI2	Blank groove detection and record detection terminal [Blank groove detection pulse is active "L". When it is "H" at start, 30cm record is detected. When it is "L", it is judged that there is no 30cm record (17cm or 25cm record is present)].
20	BI1	Cueing time read input terminal.
21	BI0	Turntable speed select and cabinet opening/closing detection terminal. (Each operation is done through key scan with E-port.)
22	EO0	Key scan output terminal (Each key-is read in through key scan with A-port).
23	EO1	
24	EO2	
25	EO3	
26	TST	Test terminal (connected to Ground not used)
27	RST	Reset terminal (The microcomputer is reset at "L", and is not reset at "H".)
28	SLCT	Select terminal (The level is set to "H" by the select terminal of the inside counter.)
29	SNSO	Offset angle detection signal input terminal
30	SNSI	Arm position detection signal input terminal
31	DO0	Turntable start/stop select terminal (Start at "L", stop at "H".)
32	DO1	Arm motor drive control terminal
33	DO2	
34	DO3	
35	DO4	
36	DO5	Muting control terminal
37	DO6	Cueing control terminal ("H" during cueing and cueing down.)
38	DO7	Cueing control terminal ("H" only during cueing down.)
39	VDD	Power supply terminal
40	OSC	Oscillation terminal

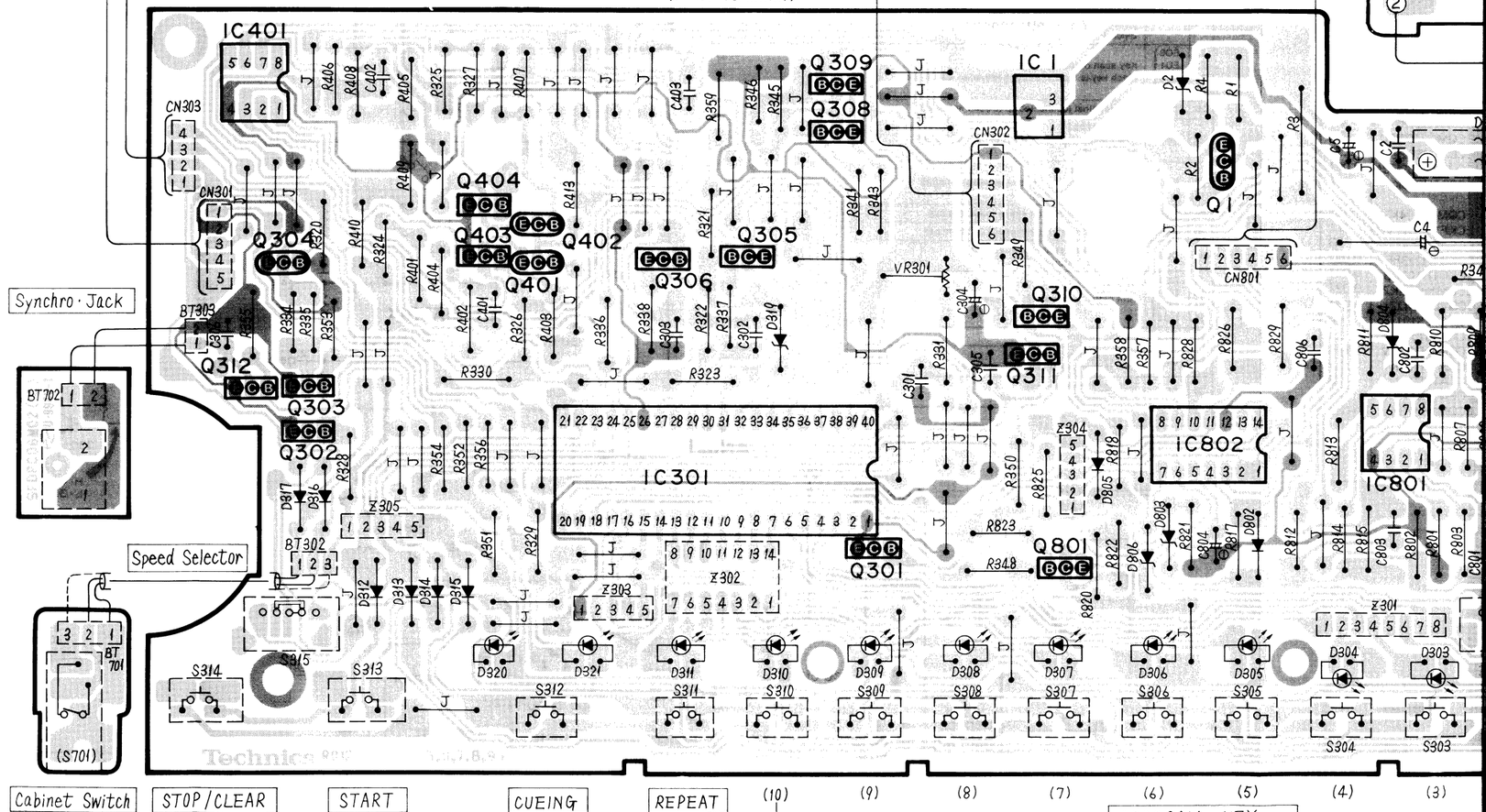


■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM

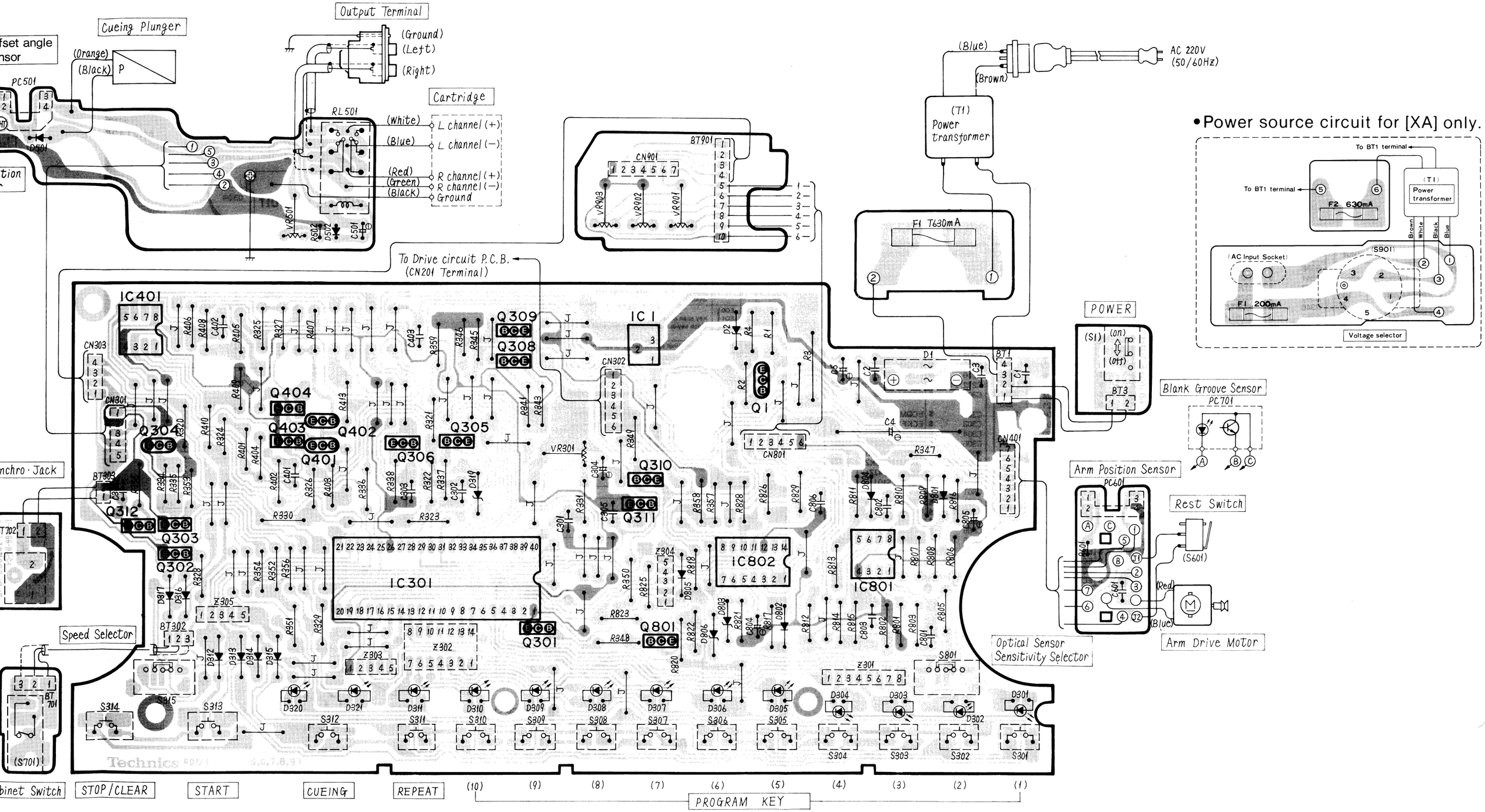
Ground (Earth) lines



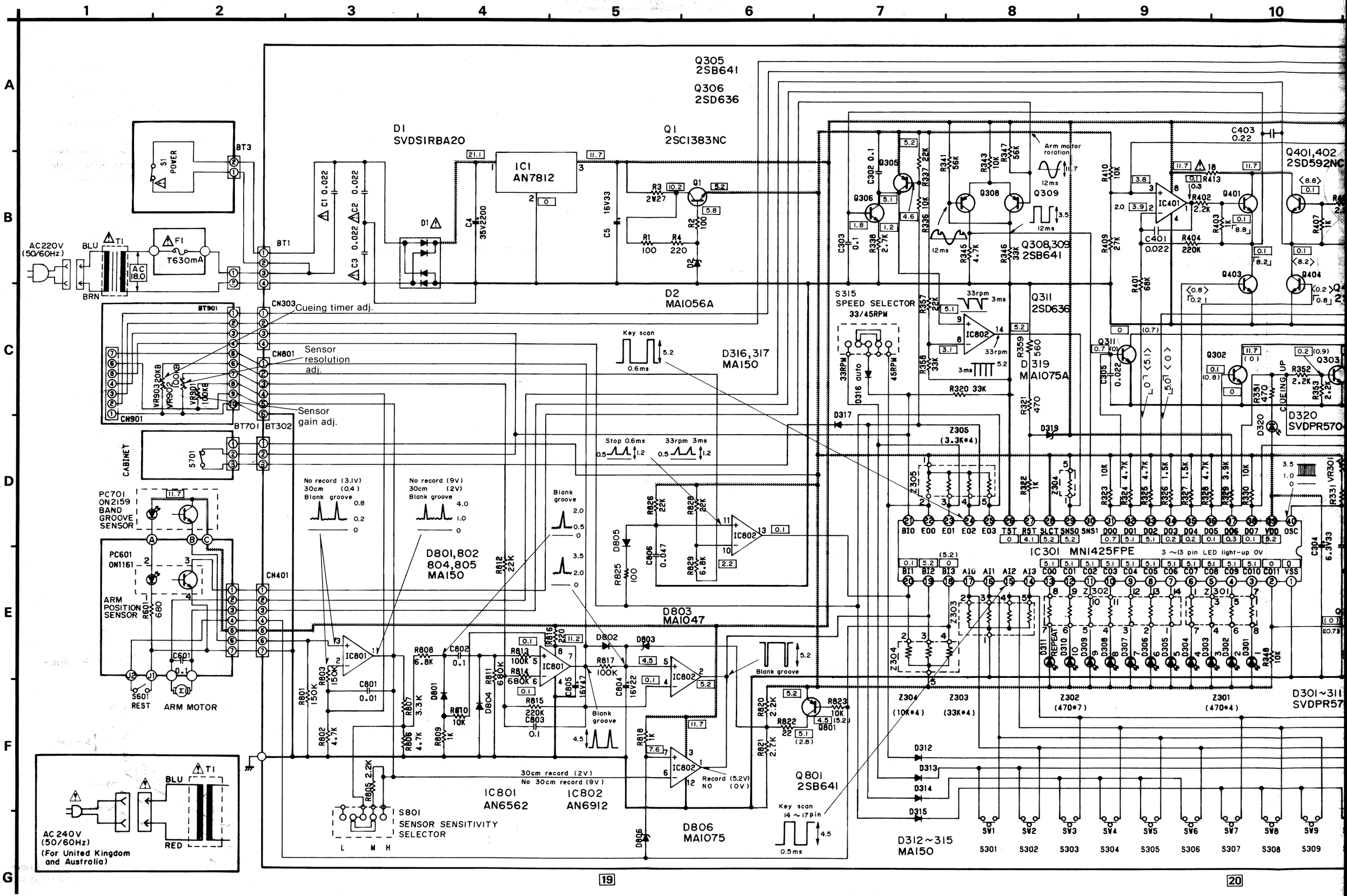


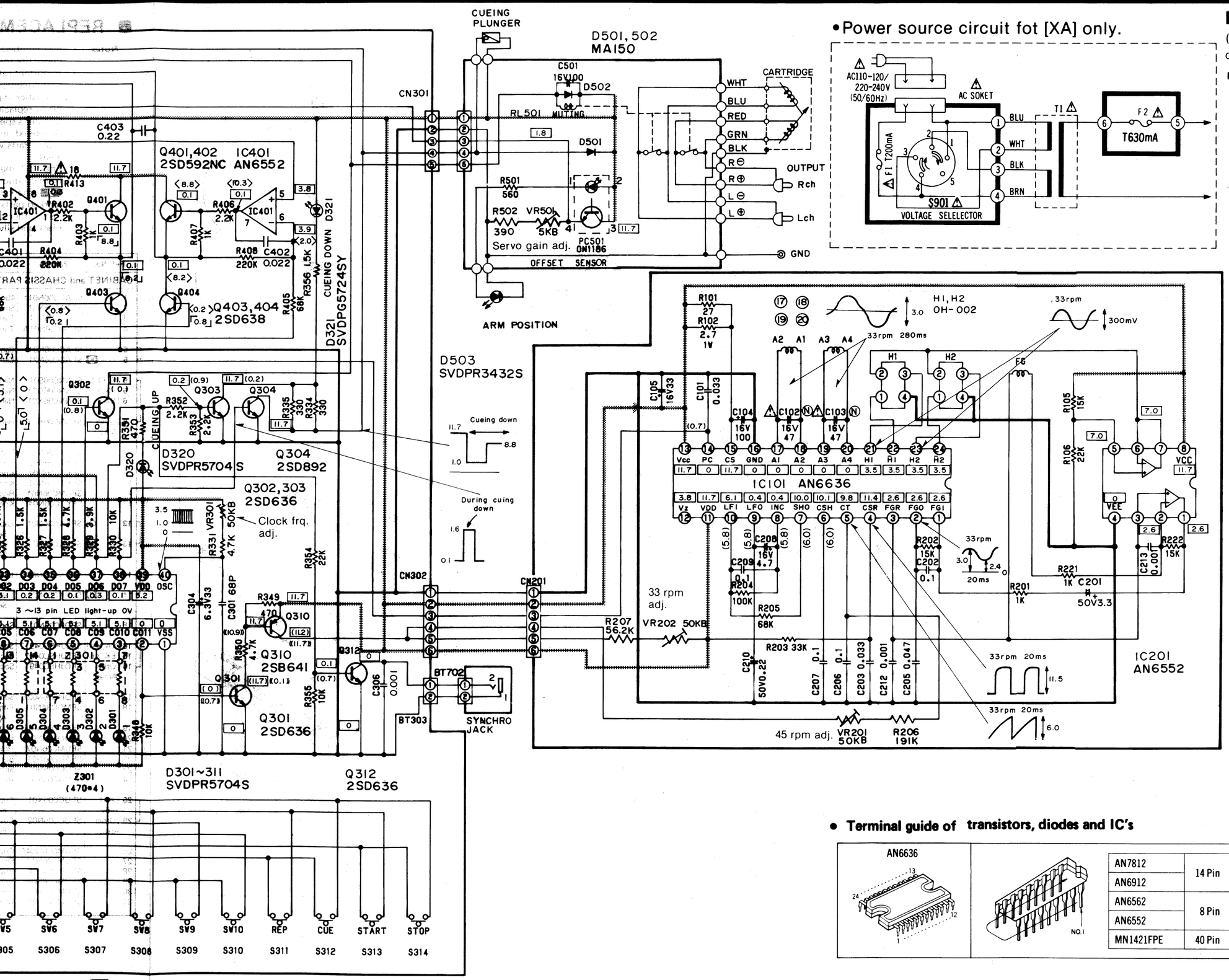


Ground (Earth) lines



• Power source circuit for [XA] only.


Q305 2SB641
Q306 2SD636
D1 SVDSIRBA20
Q1 2SC1383NC
IC1 AN7812
AC220V (50/60Hz)
BLU
BRN
T1
F1 T630mA
AC 18.0
BT3
S1 POWER
BT1
C1 0.022
C2 0.022
C3 0.022
C4 35V2200
C5 16V33
R3 2W27
R1 100
R4 220
R2 100
D2 MA1056A
BT901
CN303
Cueing timer adj.
CN801
Sensor resolution adj.
Sensor gain adj.
CN901
VR903 20KB
VR902 100KB
VR901 100KB
BT701
BT302
CABINET
S701
PC701 ON2159 BAND GROOVE SENSOR
PC601 ON1161
ARM POSITION SENSOR
R601 680
CN401
C601 0.1
S601
REST
ARM MOTOR
Key scan
0.6ms
5.2
D316,317 MA150
Stop 0.6ms
33rpm 3ms
No record (3.1V) 30cm (0.4) Blank groove
No record (9V) 30cm (2V) Blank groove
D801,802 804,805 MA150
Blank groove
D803 MA1047
R812 22K
D805
R825 100
R826 22K
R828 22K
C806 0.047
R829 6.8K
IC802
R816 220
R813 100K
R814 680K
R815 220K
C803 0.1
C805 16V47
C804 16V22
R817 100K
D802
D803
R808 6.8K
C802 0.1
R803 150K
C801 0.01
R801 150K
R802 4.7K
R807 3.3K
R806 4.7K
D801
R810 10K
D804
R811 680K
R809 1K
R818 1K
R805 2.2K
S801 SENSOR SENSITIVITY SELECTOR
L M H
30cm record (2V)
No 30cm record (9V)
IC801 AN6562
IC802 AN6912
Record (5.2V) NO (0V)
Q801 2SB641
R820 2.2K
R822 22
R823 10K
R821 2.7K
D806 MA1075
Key scan 14 ~ 17pin
0.5ms
D312~315 MA150
AC 240V (50/60Hz) (For United Kingdom and Australia)
BLU
RED
T1
Arm motor rotation
Q305
Q306
Q308
Q309
12ms
3.5ms
C302 0.1
R337 22K
R336 10K
R338 2.7K
C303 0.1
R341 56K
R343 10K
R347 56K
R345 4.7K
R346 33K
Q308,309 2SB641
S315 SPEED SELECTOR 33/45RPM
33RPM
45RPM
D316 auto
R357 22K
IC802
33rpm 3ms
R356 33K
R320 33K
Q311 2SD636
R359 560
D319 MA1075A
R321 470
D317
D319
Z305 (3.3K*4)
Z304 (10K*4)
Z303 (33K*4)
Z302 (470*7)
Z301 (470*4)
D301~311 SVDPR57
IC301 MN1425FPE
3 ~13 pin LED light-up 0V
BI0 EO0 EO1 EO2 EO3 TST RST SLCT SNSO SNS1 DO0 DO1 DO2 DO3 DO4 DO5 DO6 DO7 VDD OSC
BI1 BI2 BI3 AI0 AI1 AI2 AI3 CO0 CO1 CO2 CO3 CO4 CO5 CO6 CO7 CO8 CO9 CO10 CO11 VSS
C304 6.3V33
R331 VR301
C403 0.22
Q401,402 2SD592NC
R410 10K
R413 0.1
R402 2.2K
Q401
IC401
C401 0.022
R404 220K
R403 1K
R409 27K
R401 68K
Q403
Q404
Q311
C305 0.022
Q302
R352 2.2K
R351 470
R353 2.2K
CUEING UP
D320 SVDPR570
R407 1K
REPEAT
D311
D310
D309
D308
D307
D306
D305
D304
D303
D302
D301
R340 10K
SW1 SW2 SW3 SW4 SW5 SW6 SW7 SW8 SW9
S301 S302 S303 S304 S305 S306 S307 S308 S309



• Power source circuit fot [XA] only.

■ SCHEMATIC DIAGRAM

(The schematic diagram may be modified at any time with the development of new technology.)

Notes:

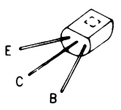
1. **S1** : Power switch in "**on**" position.
2. **S301 ~ S310** : Program switch (Program key 1 ~ 10).
3. **S311** : Repeat switch.
4. **S312** : Cueing control switch.
5. **S313** : Start switch.
6. **S314** : Stop/clear switch.
7. **S315** : Speed selector switch in "**auto**" position.
8. **S601** : Rest switch in "**off**" position. (Tonearm is off the rest position.)
9. **S701** : Cabinet switch in "**on**" position. (Upper cabinet is closed.)
10. **S801** : Optical sensor sensitivity selector switch in "**M**" position.
11. **S901** : Voltage selector in "**110 – 120V**" position. 110 – 120V ↔ 220 – 240V
12. The voltage value and waveform are the standard values of this measured by DC electronic voltmeter (high impedance) and oscilloscope on the bais of chassis. Therefore, the voltage value and waveform may include some erroe due to the internal impedance of the tester or the measuring set.
    * [ ] is the voltage when turntable is in stop.
    * ( ) is the voltage when turntable is in rotation. (at 33 rpm)
    * ⌐ ¬ is the voltage when tonearm is in lead-in mode.
    * < > is the voltage when tonearm is in return mode.
    * (( )) is the voltage at 45 rpm.
13. ..... Positive voltage lines.
14. Important safety notice: Components identifier by ⚠ make have special characteristics important for safety.

• Terminal guide of transistors, diodes and IC's

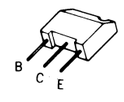
AN6636

AN7812	14 Pin
AN6912	
AN6562	8 Pin
AN6552	
MN1421FPE	40 Pin

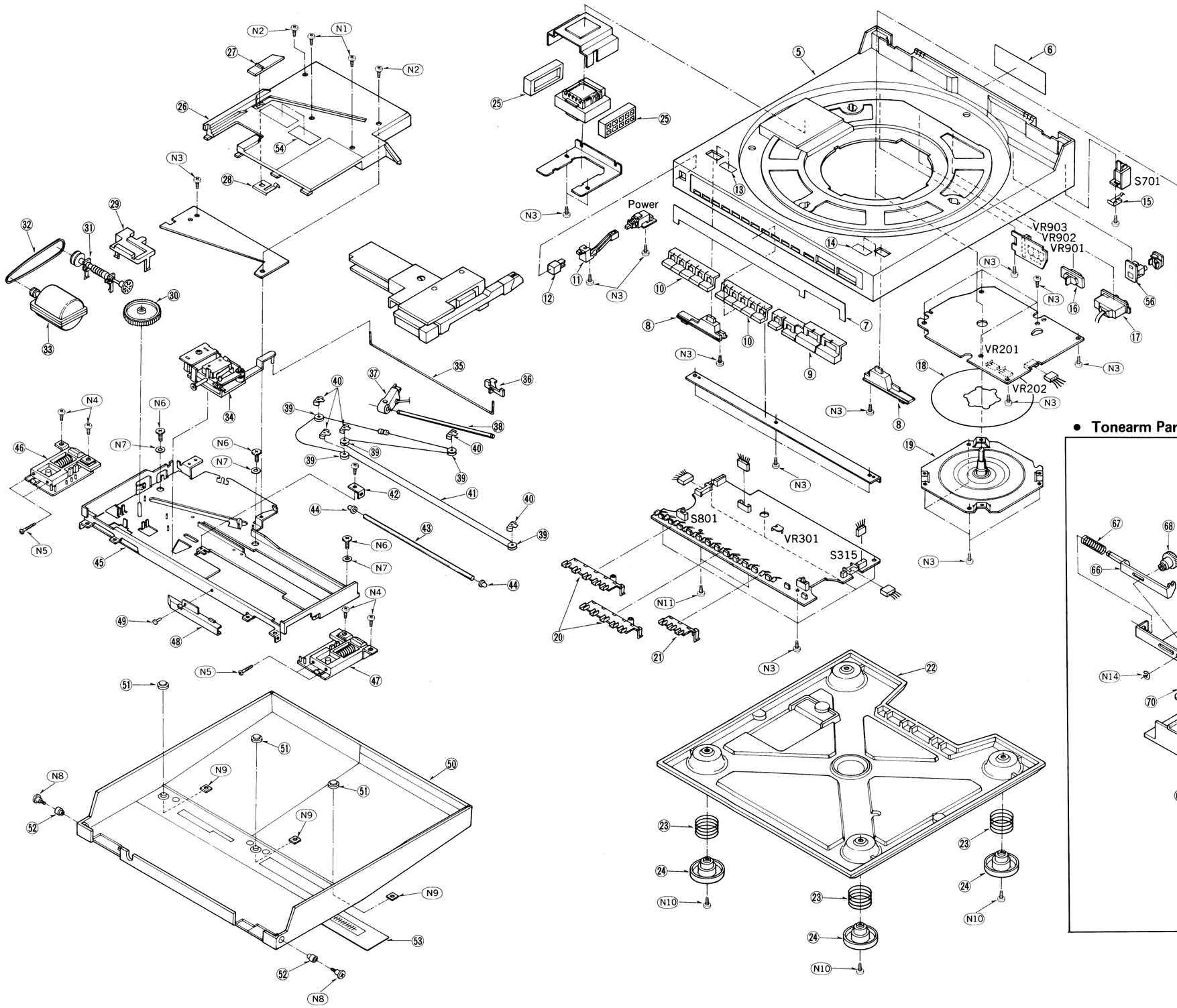
2SA1015, 2SD592NC
2SD892



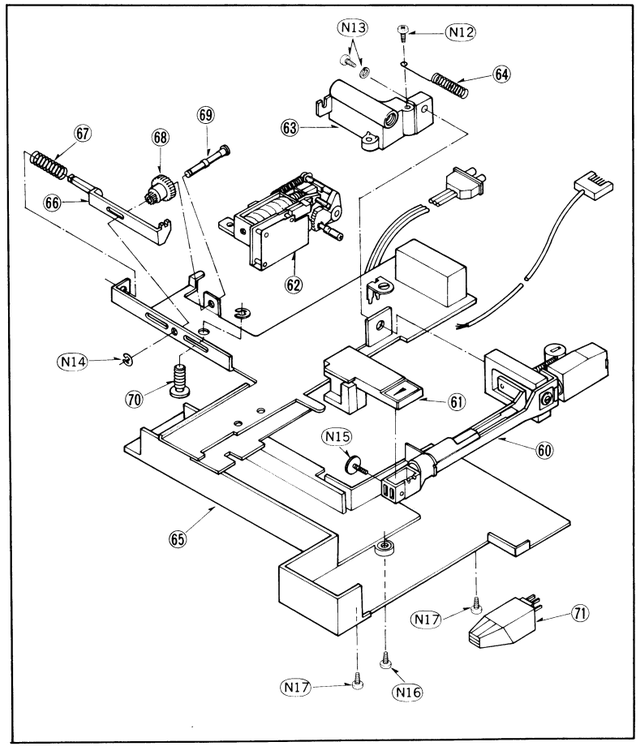
2SB641, 2SD636
2SD638



■ EXPLODED VIEW



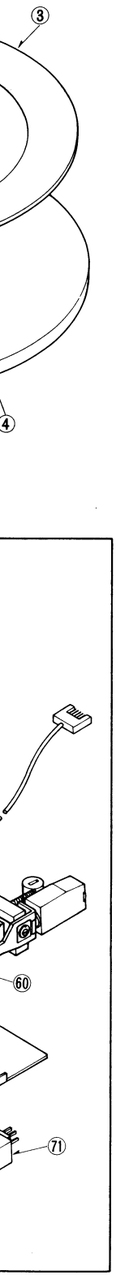
• Tonearm Parts



■ REPLACEM

Notes:
1. Part number
   Please use th
2. Important sa
   Components
   acteristics im
   When replac
   facturer's sp
3. Bracketed i
   area. Parts
   areas.
4. The "S" ma
   from produc
5. K -marke
   marked part
6. Parts other
   black and sil

Ref. No.		Part No.	
CABINET and CHASSIS PAR			
1		SFWEC06N01 ~	45
2		SFQAC06N01	Sp
3		SFTGC06N01	Tu
4		SFTEC06N01A	Tu
5	○	SFACC06N01	Ca
5	K	SFACC06N21	Ca
6 [E, EC]		SFNNC06S01	Na
6 [EX,XL]		SFNNC06G01	Na
6 [XA, XM]		SFNNC06X01	Na
6 [Other Areas]		SFNNC06R01	Na
7		SFKKC06N02	Pla
8		SFKTC06N03	Kn
9		SFKTC06N02	Kn
10		SFKTC06N01	Kn
11		SFUMC06N01	Ro
12		SFKTC06N04	Kn
13	○	SFKKC06N01	La
13	K	SFKKC06N21	La
14	○	SFKKC05N02	La
14	K	SFKKC05N21	La
15		SFQPC05N01	Sp
16 [XA,XM]		SFDJHSC04912	So
16 [EK,XL]		SFDJHSC0492	So
16 [Other Areas]		SFDJHSC0491	So
17		SFDHC05N02E	So
18		SFMGQ34N01	Fi
19		SFMZC06N01R	Sta
20		SFUMC06N06	Ho
21		SFUMC06N07	Ho
22		SFAUC06N01	Bo
23		SFQCC05N01	Sp
24		SFGAC05N02	Au
25 [XA] only		SFGCC05X01	Cu
25 [Other Areas]		SFGCC05N02	Cu
26		SFUMC06N04E	Co
27		SFUMC06N10	Sh
28		SFUPC15N11	Br
29		SFUMC06N08	Ho
30		SFUMC05N17	Ar
31		SFUMC05N16A	Wo



■ REPLACEMENT PARTS LIST...Cabinet & Chassis Parts

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "S" mark is service standard parts and may differ from production parts.
5. [K] -marked parts are used for black only, while ○-marked parts are for silver type only.
6. Parts other than [K] -and ○-marked are used for both black and silver types.

Black type model No. : SL-6 (K)

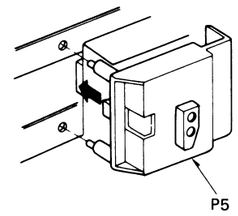
Areas

* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EG] is available in F.R. Germany.
* [EB] is available in Belgium.
* [EF] is available in France.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [EH] is available in Holland.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.
* [XM] is available in Central South America.

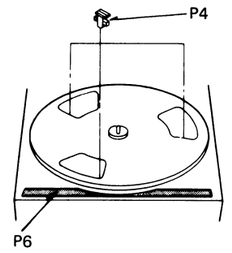
Ref. No.		Part No.	Description	
CABINET and CHASSIS PARTS				
1		SFWEC06N01	45r.p.m. Adaptor	(1)
2		SFQAC06N01	Spring	(1)
3		SFTGC06N01	Turntable Mat	(1)
4		SFTEC06N01A	Turntable Platter	(1)
5	○	SFACC06N01	Cabinet (Silver)	(1)
5	[K]	SFACC06N21	Cabinet (Black)	(1)
6 [E, EC]		SFNNC06S01	Name Plate	(1)
6 [EX,XL]		SFNNC06G01	Name Plate	(1)
6 [XA, XM]		SFNNC06X01	Name Plate	(1)
6 [Other Areas]		SFNNC06R01	Name Plate	(1)
7		SFKKC06N02	Plate, Front	(1)
8		SFKTC06N03	Knob, Speed Selector	(1)
9		SFKTC06N02	Knob, Start and Stop	(1)
10		SFKTC06N01	Knob, Music Selector	(1)
11		SFUMC06N01	Rod, Power Switch	(1)
12		SFKTC06N04	Knob, Power Switch	(1)
13	○	SFKKC06N01	Label, Sensitinity Selector (Silver)	(1)
13	[K]	SFKKC06N21	Label, Sensitivity Selector (Black)	(1)
14	○	SFKKC05N02	Lable, Speed Selector (Silver)	(1)
14	[K]	SFKKC05N21	Label, Speed Selector (Black)	(1)
15		SFQPC05N01	Spring	(1)
16 [XA,XM]		SFDJHSC04912	Socket, AC	(1)
16 [EK,XL]		SFDJHSC0492	Socket, AC	(1)
16 [Other Areas]		SFDJHSC0491	Socket, AC	(1)
17		SFDHC05N02E	Socket, Input	(1)
18		SFMGQ34N01	Film, Stator Frame Ass'y	(1)
19		SFMZC06N01R	Stator Frame Ass'y	(1)
20		SFUMC06N06	Holder, L.E.D.	(2)
21		SFUMC06N07	Holder, L.E.D.	(1)
22		SFAUC06N01	Bottom Board	(1)
23		SFQCC05N01	Spring, Audio Insulator	(4)
24		SFGAC05N02	Audio Insulator	(1)
25 [XA] only		SFGCC05X01	Cushion Rubber, Power Transformer	(1)
25 [Other Areas]		SFGCC05N02	Cushion Rubber, Power Transformer	(1)
26		SFUMC06N04E	Cover	(1)
27		SFUMC06N10	Shutter	(1)
28		SFUPC15N11	Bracket, Shutter	(1)
29		SFUMC06N08	Holder, Lead Wire	(1)
30		SFUMC05N17	Arm Drive Wheel	(1)
31		SFUMC05N16A	Worm Ass'y	(1)
32		SFGBC10–01	Belt, Arm Drive	(1)
33		SFMHC05N01E	Arm Drive Motor (with Pulley)	(1)
34		SFUMC05N02E	Plate, Rest Switch	(1)
35		SFUZC05N01	Rod, Rest Switch	(1)
36		SFUMC05N06	Guide, Rod Rest Switch	(1)
37		SFUMC06N05E	Sensor Ass'y	(1)
38		SFXJC06N01	Guide Rail, Sensor Ass'y	(1)
39		SFUMC05N22	Pulley	(5)
40		SFUMC05N23	Cap, Pulley	(5)
41		SFUZC06N01E	Arm Drive Lope Ass'y	(1)
42		SFUPC05N03	Bracket, Guide Rail	(1)
43		SFXJC05N01	Guide Rail, Arm Drive	(1)
44		SFGCC05N05	Cushion Rubber, Guide Rail	(2)
45		SFUKC06N01A	Plate Ass'y	(1)
46		SFATC05N02A	Hinge, (Left)	(1)
47		SFATC05N01A	Hinge, (Right)	(1)
48		SFUMC05N20	Guide, Lead Wire	(1)
49		SFUZC05N03	Latch	(1)
50	○	SFADC06N01E	Dust Cover (Silver)	(1)
50	[K]	SFADC06N21E	Dust Cover (Black)	(1)
51		SFGCC05N03	Cushion Rubber	(1)
52		SFGCC05N06	Cushion Cover	(1)
53	○	SFKKC06N03	Surface Plate (Silver)	(1)
53	[K]	SFKKC06N22	Surface Plate (Black)	(1)
54		SFNZC06M02	Label, Shutter	(1)
55		SFUPC06N04	Felt, Front Panel	(4)
56		SFDJC06N02	Jack, Synchro-Rec	(1)
TONE ARM PARTS				
60		SFPAM00501A	Tonearm	(1)
61		SFPAB00501E	Tonearm Position Indicator	(1)
62		SFPZB00605E	Lift Plate Ass'y	(1)
63		SFPAB00502	Bracket, Tonearm	(1)
64		SFPSP00503	Spring, Lead Wire	(1)
65		SFPCS00601	Cover, Tonearm Base	(1)
66		SFPZB00602	Cam, Adjustment	(1)
67		SFPSP00602	Spring, Adjustment Cam	(1)
68		SFPZB00603	Wheel, ADjustment Cam	(1)
69		SFPJK00601	Shaft, Wheel	(1)
70		SFPZB00604	Worm	(1)
71	★	EPC–P23S	Cartridge	(1)
	★	EPS–23ES	Stylus	(1)
SCREWS, WASHERS and NUT				
N1		XTN3+20JFZ	Screw	(2)
N2		XTN3+10JFZ	Screw	(2)
N3		XTV3+10G	Screw	(3)
N4		XTV3+6JFZ	Screw	(4)
N5		XTV3+20G	Screw	(4)
N6		SFXGC05N02	Screw	(3)
N7		SFXGC05N04	Washer	(3)
N8		SFXGC05N03	Screw	(2)
N9		XNC3HS	Nut, ϕ3	(3)
N10		XTW3+14QFYR	Screw	(4)
N11		XTV3+20G	Screw	(2)
N12		XTV3+8BFZ	Screw	(1)
N13		XSN3+5S	Screw	(1)
N14		XUC3FT	Washer	(1)
N15		SFPEV00502	Screw	(1)
N16		XTV3+10BFZ	Screw	(1)
N17		XSN26+10BV	Screw	(1)
ACCESSORIES				
A1 [EF]		SFNUC06F01	Instruction Book	(1)
A1 [EG]		SFNUC06R01	Instruction Book	(1)
A1 [Ei]		SFNUC06i01	Instruction Book	(1)
A1 [EX,XL]		SFNUC06G01	Instruction Book	(1)
A1 [XA, XM]		SFNUC06X01	Instruction Book	(1)
A1 [Other Areas]		SFNUC06S01	Instruction Book	(1)
A2		SFDHC05N01	Phono Cord	(1)
A3		SFDLC05N01	Ground Wire	(1)
A4 [XL]	**S**	RJA26Z	AC Cord	(1)
A4 [EK]	**S**	RJA43Z	AC Cord	(1)
A4 [XA, XM]	**S**	QFC1103	AC Cord	(1)
A4 [Other Areas]	**S**	RJA20Z	AC Cord	(1)
A5		SFNZC06N01	Caution Sheet	(1)
PACKING PARTS				
P1 [EF]	○	SFHPC06C01	Carton Box (Silver)	(1)
P1 [EF]	[K]	SFHPC06C21	Carton Box (Black)	(1)
P1 [Other Areas]	○	SFHPC06M01	Carton Box (Silver)	(1)
P1 [Other Areas]	[K]	SFHPC06M21	Carton Box (Black)	(1)
P2		SFHHC05N01	Pad, Front	(1)
P3		SFHHC05N02	Pad, Rear	(1)
P4		SFHKC05N01	Clamper, Turntable	(3)
P5		SFHKC05N02	Spacer, Tonearm	(1)
P6		SFHSC06N01	Spacer, Dust Cover	(1)
P7		SFYH45X50	Polyethylene Bag, Unit	(1)
P8		SFYH17X16	Polyethylene Bag, Cord	(1)

■ PACKINGS

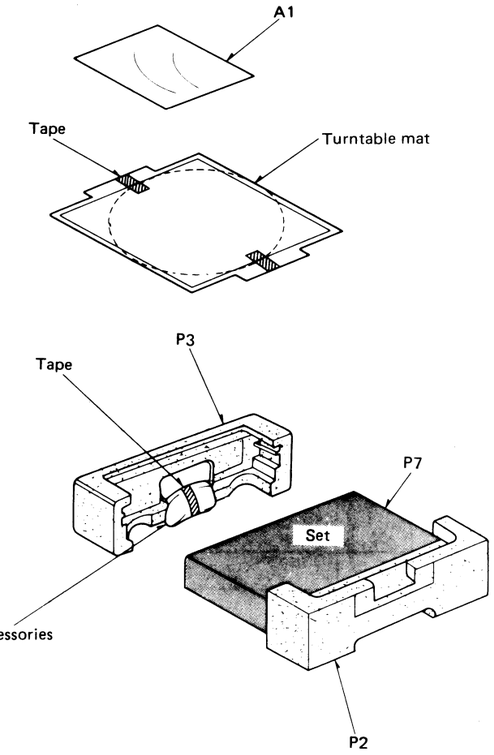
1. Set the tonearm to the start position.
2. Attach the arm spacer.



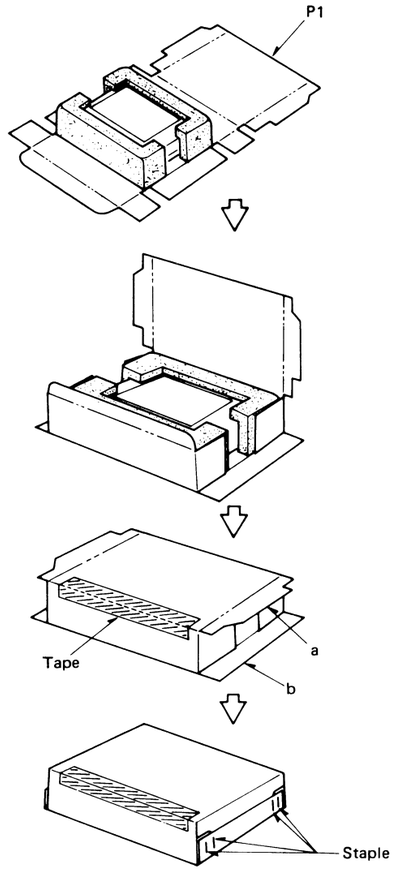
3. Attach the clamper and dust cover specer.
4. Stick the protection sheet on the top of dust cover.



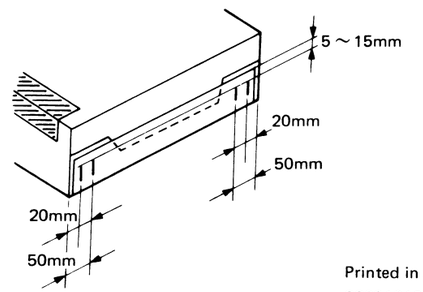
5. Put the set into the polyethylene bag and then pack it as illustrated.



6. Plase the unit (with cushions attached) as illustrated.
7. Fold the flaps according to the line marks.
8. Seal the top with adhesive tape.
   * Use gum tape or adhesive cloth tape of 50mm wide at least.
9. For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b". (Use 15 or 16mm staple)



* Stapling positions are shown below.



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ORDER NO. SD82082302C8-A

DEUTSCH

Direct Drive Automatic Turntable System SL-6

This booklet contains the specifications and adjusting procedures for SL-6, written in Germany, French and Spanish.
File this manual together with the SL-6 service manual (Order No. 82082302C8).

DEUTSCH

■ TECHNISCHE DATEN

Änderungen der technischen Daten vorbehalten.
Die angegebenen Gewichts- und Abmessungsdaten sind ungefähre Werte.

■ Allgemeine Daten

Stromversorgung: ~220 V, 50 Hz Wechselstrom
Leistungsaufnahme: 11 W
Abmessungen: 31,5 × 8,8 × 31,5 cm
(B×H×T) 31,5 × 39 × 31,5 cm
(Maximale Höhe bei vollständig geöffnetem Gehäuseoberteil)
Gewicht: 4,6 kg

■ Plattenspieler

Typ: Direktangetriebener automatischer Plattenspieler
Auto-Start/Auto-Zuführung
Rückführautomatik
Stopp-Automatik
Programmierbare Musikstück-Auswahl
Wiederhol-Betrieb
Automatische Drehzahlwahl
Manuelle Drehzahlwahl möglich
Automatische Plattengrößewahl
Plattenpräsenz-Registrierung
Antrieb: Direktantrieb
Motor: Kollektorloser Gleichstrommotor
Antriebsregel-Methode: FG-Servo-Steuerung
Plattenteller: Aluminium-Druckguß
Durchmesser 30 cm
Plattenteller-Drehzahlen: 33-1/3 und 45 U/min
Automatische Drehzahlwahl
(manuelle Wahl möglich)
Gleichlaufschwankungen: 0,012% WRMS*
0,025% WRMS (JIS C5521)
±0,035% Spitze
(IEC 98A bewertet)
Rumpel-Fremdspannungsabstand: −56 dB (IEC 98A unbewertet)
Rumpel-Geräuschspannungsabstand: −78 dB (IEC 98A bewertet)

* Gemessen anhand von Signalen vom eingebauten Frequenzgenerator des Motorbauteils.

■ Tonarm

Typ: Dynamisch ausbalancierter Tangential-Tonarm mit Kardanaufhängung mit 4-Punkt-Drehlager
Effektive Länge: 10,5 cm
Spurfehlwinkel: Innerhalb ±0,1°
Effektive Masse: 9 g (einschließlich Tonabnehmer)
Resonanzfrequenz: 12 Hz
Tonarm-Antriebsmotor: Gleichstrommotor
Phonokabel-Kapazität: 150 pF

■ Tonabnehmer

Typ: Stereo-Magnet-Tonabnehmer
Magnetkreis: Ganzlamellenkern
Frequenzgang: 10 Hz bis 40 kHz
20 Hz bis 10 kHz ±1 dB
Ausgangsspannung: 2,5 mV bei 1 kHz
5 cm/s. Null-zu-Spitze, lateral
[7 mV bei 1 kHz 10 cm/s. Null-zu-Spitze, 45° (DIN 45 000)]
Kanaltrennung: 22 dB bei 1 kHz
Kanalabweichung: Innerhalb 2 dB bei 1 kHz
Empfohlene Endimpedanz: 47 kΩ ~ 100 kΩ
Nachgiebigkeit (dynamisch): 12×10^{-6} cm/dyn bei 100 Hz
Auflagekraft-Einstellbereich: 1,25 ±0,25 g (12,5 ±2,5 mN)
Gewicht: 6 g (nur Tonabnehmer)
Ersatznadel: EPS-23ES (Elliptische Nadel)

■ JUSTIERUNGEN

● Verwendete Geräte und Zustand des Gerätes

1. Osizlloskop
2. Gleichstrom-Voltmeter
3. Platte (SFTR007) für Justierung
4. Anschlußverbindung für Justierung
5. Die Bodenplatte und die Abdeckung abnehmen. (Abb. 29)
6. Den Empfindlichkeits-Wahlschalter das optischen Sensors auf "M" stellen.

Schritt	Gegenstand	Vorbereitungen für die Justierung	Zu justierende Teile	Justiermethode
1	**Startposition**	1. Das Gehäuseoberteil öffnen und eine Platte auflegen. 2. Den Ein/Aus-Schalter einschalten. 3. Den Startschalter drücken.	Absenkpositions-Justierschraube (Abb. 26)	1. Die Absenkpositions-Justierschraube derehen. Wenn er zwischen Musikstücken abgesenkt wird, die Schraube im Uhrzeigersinn drehen. 2. Wenn er außerhalb der Platte abgesenkt wird, die Schraube entgegen dem Uhrzeigersinn drehen.

DEUTSCH

Schritt	Gegenstand	Vorbereitungen für die Justierung	Zu justierende Teile	Justiermethode
2	**Uhrfrequenz**	1. Den Emitter von Q1 mit IC301 Stift 14 verbinden (Abb. 27) 2. Das Oszilloskop and IC301 Stift 13 anschließen.	VR301	1. Den Ein/Aus-Schalter einschalten. 2. VR301 so abgleichen, daß der Zyklus der Ausgangswellenform 40μs ± 2μs beträgt. (Abb. 28)
3	**Sensorverstärkung**	1. Die Abdeckung entfernen und die Anschlußverbindung für die Justierung in den Anschluß CN901 einstecken. (Abb.29) 2. Das Oszilloskop an Stift 6 (+) und Stift 1 (−) anschließen. 3. Die Platte für Justierung mit Seite A auflegen.	VR901 (Abb. 26)	1. Den Ein/Aus-Schalter einschalten und den Tonarm zu einer blanken Stelle der Platte hin bewegen. 2. VR901 so abgleichen, daß die Ausgangsspannung 4V ± 0,4V verträgt.
4	**Sensorauflösung**	1. Die Abdeckung entfernen und die Anschlußverbindung für Justierung in den Anschluß CN901 einstecken. (Abb. 29) 2. Das Oszilloskop an Stift 7 (+) und Stift 1 (−) anschließen. 3. Die Platte für Justierung mit Seite A auflegen.	VR902 (Abb. 26)	1. Den Ein/Aus-Schalter einschalten. 2. Die Programmtaste drücken, um sie den Tonarm suchen zu lassen. (Ausgangsleistung tritt auf zwischen den Musikstücken.) 3. VR902 so abgleichen, daß die maximale Ausgangsleistung zwischen den Musikstücken 2,7V ± 0,27V beträgt. (Abb. 30)
5	**Lift-Zeitsteuerung**	1. Die Abdeckung entfernen und die Anschlußverbindung für Justierung in den Anschluß CN901 einstecken. (Abb. 29) 2. Das Gerät an einen Verstärker anschließen. (Phono-Ausgang) 3. Stift 3 (+) und Stift 1 (−) an Kanal (1) des Zweikanal-Oszilloskops anschließen. 4. Den Lautsprecheranschluß des Verstärkers an Kanal (2) die Zweikanal-Oszilloskops anschließen. 5. Stift 2 und Stift 1 verbinden. (Stummschaltungsbetrieb stoppt.) 6. Die Platte für Justierung mit Seite B auflegen.	VR903 (Abb. 26)	1. Den Ein/Aus-Schalter einschalten. 2. Den Tonarm zu einer bespielten Stelle (enge Rillen) der Platte bewegen und die Lifttaste drücken, um ihn abzusenken. 3. Die Zeit bis zur Beendigung des Liftbetriebs (Anstieg des Liftsignals) überprüfen, nachdem die Nadelspitze die Plattenoberfläche berührt. 4. VR903 so abgleichen, daß die Zeit bis zur Beendigung des Liftbetriebs 0,3 ~ 0,5 sec. beträgt. (Abb. 31) *** Anmerkung: 10**
6	**Absenken zwischen Musikst**	1. Das Gehäuseoberteil öffnen und den Gehäuseschalter mit Klebband in der gedrückten Stellung arretieren. 2. Die Platte für Justierung mit Seite B auflegen. 3. Das Gehäuseoberteil schließen. 4. Das Gerät an den Verstärker anschließen. (Die Lautsprecher an die Lautsprecher-Anschlüsse anschließen.)	Sensor-Verstellschraube (Abb. 32)	1. Den Ein/Aus-Schalter einschalten und den Startschalter zum Bewegen den Tonarms nach innen drücken. 2. Die Programmtaste 2 und anschließend den Startschalter drücken. 3. Nach Beendigung des Liftbetriebs die Programmtaste 2 zum Zwecke des Überspringens drücken. 4. Überprüfen, daß die Absenkposition bei "20 ~ 21" liegt. 5. Falls die Absenkposition falsch ist, das Gehäuseoberteil öffnen und die Sensor-Verstellschraube drehen. 6. Das Gehäuseoberteil schließen und die Programmtaste 2 drücken. 7. So abgleichen, daß die Absenkposition auf "20 ~ 21" zu liegen kommt. Schritte 4 ~ 7 wiederholen.
7	**Tonarm-Spurfehlwinkel**	1. Das Gehäuseoberteil öffnen und den Gehäuseschalte mit Klebband in der gedrückten Stellung arretieren. 2. Das Gehäuseoberteil schließen.	Justierschraube (Abb. 33)	1. Den Ein/Aus-Schalter einschalten und den Startschalter zum Bewegen den Tonarms nach innen drücken. 2. Das Gehäuseoberteil öffnen. 3. Die Justierschraube so weit drehen, daß die Tonarmmitte mit der V-Kerbe der Liftstange übereinstimmt.

Schritt	Gegenstand	Vorbereitungen für die Justierung	Zu justierende Teile	Justiermethode
8	**Servo-Verstärkung und Offsetspannung**	1. Das Gehäuseoberteil öffnen und den Gehäuseschalter mit Klebband in der gedrückten Stellung arretieren. 2. Das Gehäuseoberteil schließen. 3. Das Gleichstromvoltmeter an CN301 Anschluß 3 und den Erdungsanschluß anschließen. 4. Das Etikett der Tonarmabdeckung entfernen.	VR501 (Servo-Verstärkung) Leiterplatte (Offsetspannung) (Abb. 32)	1. Den Ein/Aus-Schalter einschalten und den Startschalter drücken, um den Tonarm nach innen zu bewegen. 2. Das Gehäuseoberteil öffnen. 3. Den Tonarm vollständig gegen rechts bewegen. VR501 dann so abgleichen, daß die Spannung 3,6V beträgt. (Servo-Verstärkung) 4. Den Tonarm zur Mitte hin stellen und überprüfen, daß die Ausgangsspannung 1,8V beträgt. 5. Falls die Spannung nicht 1,8V beträgt, die Schraube der Leiterplatte lösen und die Platte mit einem Schraubendreher nach links oder rechts bewegen, bis die Ausgangsspannung 1,8V beträgt. Nach der Justierung ist die Befestigungsschraube der Leiterplatte wieder festzudrehen. (Offset-Justierung)
9	**Drehzahl**	1. Das Gehäuseoberteil öffnen und die Platte auflegen.	VR201 (45 U/min.) VR202 (33 U/min.)	1. Den Ein/Aus-Schalter einschalten. 2. Den Drehzahl-Wahlschalter auf 45 U/min. einstellen. 3. VR201 drehen, um die Drehzahl auf die Nenndrehzahl von 45 U/min. abzugleichen. 4. Den Drehzahlwahlschalter auf 33 U/min. einstellen. 5. VR202 drehen, um die Drehzahl auf die Nenndrehzahl von 33-1/3 U/min. abzugleichen. Anmerkung: Die Justierung für 45 U/min. muß unbedingt zuerst durchgeführt werden.
*** Anmerkung**				
10	Die Kippzeit des Oszilloskops auf 0,2 sec/cm oder 0,5 sec/cm einstellen. Zum Beispiel im Falle von 0,2 sec/cm, ist so zu justieren, daß das Liftbetriebsbeendigungssignal 2 Skalenmarkierungen (0,4 sec.) später als die Abgabe des Phono-Ausgangssignals auftritt.			

FRANÇAIS

■ CARACTERISTIQUES

Les spécifications sont susceptibles d'être modifiées sans préavis.
Le poids et les dimensions donnés sont approximatifs.

■ Généralités

Alimentation: Alternatif 110-120/220-240V, 50 ou 60 Hz
Consommation: 11 W
Dimensions: (L×H×P) 31,5 × 8,8 × 31,5 cm / 31,5 × 39 × 31,5 cm (Hauteur maximum lorsque le dessus (couvercle protège-poussière) est ouvert.)
Poids: 4,6 kg

■ Platine de lecture

Type: Entraînement direct
Platine automatique
Départ automatique/Entrée automatique
Retour automatique
Sélection de plages programmable
Arrêt automatique
Auditon répétée
Sélection de vitesse automatique
Sélection automatique du diamètre
Sélection de vitesse manuelle possible
Détection de la présence d'un disque
Système d'entraînement: Entraînement direct
Moteur: Moteur C.C. sans balai
Système de commande d'entrainement: Générateur de fréquences à servo-commande
Plateau de lecture: Aluminium moulé sous pression Diamètre 30 cm
Vitesses de la platine: 33-1/3 et 45 t/p.m.
Sélecteur de vitesse automatique (Sélection manuelle possible)
Pleurage et scintillement: 0,012% de valeur efficace*
0,025% de valeur efficace (JIS C5521)
±0,035% de crête (IEC 98A Pondéré)

* Mesuré par l'obtention d'un signal provenant du générateur de fréquences incorporé de l'ensemble du moteur.

Ronflement: −56 dB (IEC 98A Non pondéré)
−78 dB (IEC 98A Pondéré)

■ Bras de lecture

Type: Bras de lecture d'alignement linéaire de type à équilibre dynamique avec suspension à la cardan à 4 pivots
Longueur effective: 105 mm
Angle d'erreur de piste: En deçà de ±0,1°
Masse réelle: 9 g (y compris la cellule pick-up)
Fréquence de résonance: 12 Hz
Moteur d'entraînement du bras de lecture: Moteur C.C.
Capacitance du câble phono: 150 pF
Circuit magnétique: Noyau entièrement feuilleté
Réponse en fréquence: 10 Hz à 40 kHz
20 Hz à 10 kHz ±1 dB
Tension de sortie: 2,5 mV à 1 kHz; 5 cm/s. zéro à vitesse latérale de crête (7 mV à 1 kHz; 10 cm/s., zéro à vitesse 45° de crête [DIN 45 000])
Séparation des canaux: 22 dB à 1 kHz
Equilibrage des canaux: En deçà de 2 dB à 1 kHz
Impédance de charge recommandée: 47 kΩ~100 kΩ
Elasticité (dynamique): 12×10^{-6} cm/dyne à 100 Hz
Plage de la force verticale d'appui: 1,25 ±0,25 g (12,5 ±2,5 mN)
Poids: 6 g (cellule seule)
Remplacement de la pointe de lecture: EPS-23ES (Forme elliptique)

■ Cellule pick-up

Type: Cellule pick-up stéréo à aimant mobile

■ REGLAGES

● Equipement utilisé et conditions de service de l'appareil

1. Oscilloscope (à deux canaux)
2. Voltmètre à C.C.
3. Disque (SFTR007) pour la mise au point
4. Connecteur pour le réglage
5. Enlever la plaquette du fond et retirer le panneau de protection (Fig. 29).
6. Régler le sélecteur de sensibilité du détecteur optique sur "M".

Etape	Artiele	Préparatifs pour le réglage	Portion du réglage	Méthode de mise au point
1	**Position de démarrage**	1. Ouvrir le boîtier supérieur et placer un disque. 2. Mettre en circuit l'interrupteur d'alimentation. 3. Appuyer sur la touche "Start" (mise en marche).	Vis d'ajustement de la position descendante. (Fig. 26)	1. Tourner la vis d'ajustement de la position descendante. Si elle descend entre les plages, tourner la vis dans le sens des aiguilles d'une montre. Si elle descend à l'extérieur du disque, tourner la vis dans le sens inverse des aiguilles d'une montre.
2	**Fréquence des impulsions de rythme**	1. Raccorder l'émetteur Q1 à la broche 14 de IC301 (Fig. 27) 2. Raccorder l'oscilloscope à la broche 13 de IC301.	VR301	1. Mettre en circuit l'interrupteur d'alimentation. 2. Ajuster VR301 de telle sorte que la forme d'onde de sortie soit de 40μs ± 2μs. (Fig. 28)
3	**Gain du dispositif dérecteur**	1. Retirer le panneau de protection et insérer le connecteur pour le réglage dans la borne CN901. (Fig. 29) 2. Raccorder l'oscilloscope à la broche 6 (+) et à la broche 1 (−). 3. Installer le disque pour la mise au point avec le côté A vers le haut.	VR901 (Fig. 26)	1. Mettre en circuit l'interrupteur d'alimentation et déplacer le bras de lecture sur la surface vierge du disque. 2. Ajuster VR901 de telle sorte que la tension de sortie soit de 4V ± 0,4V.
4	**Résolution du dispositif détecteur**	1. Retirer le panneau de protection et insérer le connecteur pour le réglage dans la borne CN901. (Fig. 29) 2. Raccorder l'oscilloscope à la broche 7 (+) et à la broche 1 (−). 3. Installer le disque pour la mise au point avec le côté A vers le haut.	VR902 (Fig. 26)	1. Mettre en circuit l'interrupteur d'alimentation. 2. Appuyer sur la touche de programmation pour la laisser rechercher le bras de lecture. (La puissance de sortie est déliverée entre les plages.) 3. Ajuster VR902 de telle sorte que la puissance de crête entre les plages soit de 2,7V ± 0.27V. (Fig. 30)
5	**Minuteur de pose/relevage**	1. Retirer le panneau de protection et insérer le connecteur pour le réglage dans la borne CN901. (Fig. 29) 2. Raccorder l'appareil à l'amplificateur. (Sortie pickup) 3. Connecter la broche 3 (+) et la broche 1 (−) an canal (1) de l'oscilloscope à deux canaux. 4. Connecter la borne du haut-parleur de l'amplificateur au canal (2) de l'oscilloscope à deux canaux. 5. Connecter la broche 2 et la broche 1. (Arrête le fonctionnement de l'accord silencieux.) 6. Installer le disque pour la mise au point avec le côté B vers le haut.	VR903 (Fig. 26)	1. Mettre en circuit l'interrupteur d'alimentation. 2. Déplacer le bras de lecture sur une partie enregistrée (sillon) du disque, et appuyer sur la touche de pose/relevage pour une opération de pose. 3. Vérifier la durée jusqu'à l'achèvement de la pose (augmentation du signal de pose) après que le pointe de lecture ait touchée la surface du disque. 4. Ajuster VR903 de telle sorte que la durée jusqu'à l'achèvement de la pose soit de 0,3 ~ 0,5 sec. (Fig. 31) *** Nota: 10**

Etape	Artiele	Préparatifs pour le réglage	Portion du réglage	Méthode de mise au point
6	**Descente entre les plages**	1. Ouverir le boîtier supérieur et maintenir appuyée la touche du boîtier avec une bande adhésive. 2. Installer le disque pour la mise au point avec le côté B vers le haut. 3. Refermer le boîtier supérieur. 4. Raccorder l'appareil à o'amplificateur. (Raccorder les haut-parleurs aux bornes des hautparleurs.)	Vis de déchalage du dispositif détecteur. (Fig. 32)	1. Mettee en circuit l'interrupteur d'alimentation. 2. Appuyer respectivement sur la touche de programmation 2 et sur la touche de mise en marche. 3. Après l'achèvement de la pose, appuyer sur la touche de programmation 2 dans le but d'opèrer un saut. 4. S'assurer que la position descendante est au compte de "20 ~ 21". 5. Si le position descendante est incorrecte, ouvrir le boîtier supérieur et tourner la vis de décalage du dispositif détecteur. 6. Refermer le boîtier supérieur et appuyer sur la touche de programmation 2. 7. Ajuster de telle sorte que la position descendante soit au compte de "20 ~ 21". Répéteur les étapes 4 ~ 7.
7	**Angle de décalage du bras de lecture**	1. Ouvrir la boîtier supérieur et maintenir appuyée la touche du boîtier avec une bande adhésive. 2. Refermer le boîtier supérieur.	Vis de réglage (Fig. 33)	1. Mettre en circuit l'interrupteur d'alimentation et sppuyer sur la touche de mise en marche pour faire déplacer le bras de lecture vers l'intérieur. 2. Ouvrir le boîtier supérieur. 3. Tourner la vis de réglage de façon à ce que le centre du bras coïncide avec la rainure en V de la tige d'élévation.
8	**Amplification servo-mécanique et tension d'écart de réglage**	1. Ouvrir le boîtier supérieur et maintenir appuyée la touche du boîtier avec une bande adhésive. 2. Refermer le boîtier supérieur. 3. Raccorder le voltmètre à C.C. à la borne 3 de CN301 et à la borne de mise à la terre. 4. Retirer l'étiquette adhésive de la coiffe protectrice du bras de lecture.	VR501 (Amplification servo-mécanique) Plaquette à circuis imprimés (Tension d'écart de réglage) (Fig. 32)	1. Mettre en circuit l'interrupteur d'alimentation et appuyer sur la touche de mise marche pour faire déplacer le bras de lecture vers l'intérieur. 2. Ouvrir le boîtier supérieur. 3. Déplacer complètement le bras de lecture vers la droite. Puis, ajuster VR501 de telle sorte que la tension soit de 3,6V. (Amplification servo-mécanique.) 4. Régler le bras de lecture au centre et s'assurerque la tension de sortie soit de 1,8V. 5. Si la tension n'est pas de 1,8V, desserrer la vis de la plaquette à circuits imprimés et déplacer la plaquette vers la droite ou vers la gauche avec un tournevis, de telle sorte que la tension de sortie soit de 1,8V. Après la mise au point, resserrer la vis de la plaquette à circuits imprimés. (Ajustement de l'écart de réglage)
9	**Vitesse de rotation**	1. Ouvrir le boîtier supérieur et installer un disque.	VR201 (45 t/p.m.) VR202 (33 t/p.m.)	1. Mettre en circuit l'interrupteur d'alimentation. 2. Régler le commutateur sélecteur de vitesse sur 45 t/p.m. 3. Tourner VR201 pour ajuster la vitesse à la vitesse nominale de rotation(45 t/p.m.) 4. Régler le commutateur sélecteur de vitesse sur 33 t/p.m. 5. Tourner VR202 pour ajuster la vitesse à la vitesse nominale de rotation (33-1/3 t/p.m.). Nota: S'assurer de régler tout d'abord sur 45 t/p.m.
*** Nota**				
10	Régler la durée de balayage de l'oscilloscope sur 0,2 sec./cm ou sur 0,5 sec./cm. Par exemple, dans le cas d'une plage de 0,2 sec./cm, l'ajuster de telle sorte que le signal d'achèvement de pose/relevage soit délivré à un étalonnage de 2 (0,4 sec.) plus tard que la délivrance du signal de sortie pick-up.			

ESPAÑOL

■ ESPECIFICACIONES

Las especificaciones quedan sujetas a cambios sin aviso previo.
El peso y las dimensiones indicados son apromimados.

■ En general

Alimentación de corriente: ~110-120/220-240 V, 50 ó 60 Hz
Consumo de corriente: 11 W
Dimensiones: 31,5 × 8,8 × 31,5 cm
(Ancho×Alto×Prof.) 31,5 × 39 × 31,5 cm
(Altura máxima cuando la parte de arriba (tapa contra el polvo) está abierta.)
Peso: 4,6 kg

■ Sección del plato giratorio

Tipo: Accionamiento directo
Plato giratorio automático
Arranque automático/
Comienzo automático
Retorno automático
Parada automática
Selección programable de bandas
Ejecución repetida
Selección automática de la velocidad
Es posible seleccionar la velocidad a mano
Selección automática del tamaño
Detección de presencia de disco
Método de accionamiento: Accionamiento directo
Motor: Motor de corriente continua sin escobillas
Método de control de accionamiento: Servocontrol por generador de frecuencias
Platillo del plato giratorio: Aluminio fundido
30 cm de diámetro
Velocidades del plato giratorio: 33-1/3 y 45 rpm
Selección automática de la velocidad
(También posibilidad de seleccionar a mano)
Ululaciones y trémolo: 0,012% WRMS*
0,025% WRMS (JIS C5521)
±0,035% cresta
(IEC 98A Ponderado)

* Medido obteniendo una señal proveniente del generador de frecuencias incorporado del conjunto del motor.

Ruido de rodadura: −56 dB (IEC 98A No ponderado)
−78 dB (IEC 98A Ponderado)

■ Sección del brazo sonoro

Tipo: Brazo sonoro de seguimiento lineal de tipo con equilibrio dinámico con suspensión cardánica de 4 pivotes
Longitud efectiva: 10,5 cm
Angulo de error de seguimiento: Inferior a ±0,1° aproxim.
Masa efectiva: 9 g (incluyendo el cartucho)
Frecuencia de resonancia: 12 Hz
Motor de accionamiento del brazo sonoro: Motor de corriente continua
Capitancia del cable del fonógrafo: 150 pF

■ Sección del cartucho

Tipo: Cartucho estereofónico de imán móvil
Circuito magnético: Núcleo totalmente laminado
Respuesta de frecuencia: 10 Hz a 40 kHz
20 Hz a 10 kHz ±1 dB
Voltaje de salida: 2,5 mV a 1 kHz
Velocidad lateral de cero a cresta de 5 cm/s
(7 mV a 1 kHz. Velocidad de 45° de cero a cresta de 10 cm/s [DIN 45 000])
Separación de canales: 22 dB a 1 kHz
Equilibrio de canales: Inferior a 2 dB a 1 kHz
Impedancia de carga recomendada: 47 kΩ a 100 kΩ
Elasticidad (dinámica): 12×10^{-6} cm/dina a 100 Hz
Radio de presión de la aguja: 1,25 ±0,25 g (12,5 ±2,5 mN)
Peso: 6 g (cartucho solamente)
Aguja de recambio: EPS-23ES (Aguja eliptica)

■ AJUSTES

- **Equipos usados y estado del aparato**

1. Osciloscopio (dos canales)
2. Voltímetro de corriente continua
3. Disco (SFTR007) de ajuste
4. Conector de ajuste
5. Quitar el tablero del fondo y separar la tapa. (Fig. 29)
6. Poner el selector de sensibilidad del sensor óptico en "M".

Paso	Punto tratado	Preparativos para el ajuste	Porción a ajustar	Manera de hacer el ajuste
1	**Posición de arranque**	1. Abrir el gabinete superior y colocar el disco. 2. Encender el interruptor de la corriente. 3. Empujar el interruptor de arranque ("Start").	Tornillo de regulación de la posición de descenso (Fig. 26)	1. Hacer girar el tornillo de regulación de la posición de descenso. Si se deposita en medio de una pieza, girar el tornillo hacia la derecha. Si se deposita fuera del disco, girar el tornillo hacia la izquierda.

Paso	Punto tratado	Preparativos para el ajuste	Porción a ajustar	Manera de hacer el ajuste
2	**Frecuencia del reloj**	1. Conectar el emisor Q1 al pasador 14 de IC301. (Fig. 27) 2. Conectar el osciloscopio al pasador 13 de IC301.	VR301	1. Encender el interruptor de la corriente. 2. Regular VR301 de manera tal que el ciclo de la forma de onda de salida sea de 40μs ± 2μs. (Fig. 28)
3	**Ganancia del sensor**	1. Quitar la tapa y meter el conector de ajuste en el borne CN901. (Fig. 29) 2. Conectar el osciloscopio al pasador (+) 6 y al pasador (–) 1. 3. Colocar el disco de ajuste con el lado A mirando hacia arriba.	VR901 (Fig. 26)	1. Encender el interruptor de la corriente y mover el brazo sonoro sobre la porción sin grabar del disco. 2. Regular VR901 de manera tal que la tensión de salida sea de 4V ± 0,4V.
4	**Resolución del sensor**	1. Quitar la tapa y meter el conector de ajuste en el borne CN901. (Fig. 29) 2. Conectar el osciloscopio al pasador (+) 7 y al pasador (–) 1. 3. Colocar el disco de ajuste con el lado A mirando hacia arriba.	VR902 (Fig. 26)	1. Encender el interruptor de la corriente. 2. Apretar la tecla de programas para que busque el brazo sonoro. (La salida se suministra entre las piezas.) 3. Regular VR902 de manera tal que la salida de cresta entre las piezas sea de 2,7V ± 0,27V. (Fig. 30)
5	**Cronizador de colocación**	1. Quitar la tapa y meter el conector de ajuste en el borne CN901. (Fig. 29) 2. Conectar el aparato al amplificador. (Salida para fonógrafo) 3. Conectar el pasador (+) 3 y el (–) 1 al canal (1) de los dos canales de que dispone el osciloscopio. 4. Conectar el borne pare altoparlante del amplificador al canal (2) de los dos canales de que dispone el osciloscopio. 5. Conectar el pasador 2 y el 1. (Cesa la operación de silenciamiento.) 6. Colocar el disco de ajuste con el lado B mirando hacia arriba.	VR903 (Fig. 26)	1. Encender el interruptor de la corriente. 2. Mover el brazo sonoro sobre una porción gradada (con surcos) del disco y apretar el interruptor de colocación para hacer que se deposite. 3. Revisar el tiempo requerido hasta completar la colocación (subida de la señal de colocación) después que la aguja haya tocado la superficie del disco. 4. Regular VR903 de manera tal que el tiempo hasta completar la colocación sea de 0,3 a 0,5 de segundo. (Fig. 31) *** Nota: 10**
6	**Descenso entre las piezas**	1. Abrir el gabinete superior y sujetar el interruptor del mismo con cinta. 2. Colocar el disco de ajuste con el lado B mirando hacia arriba. 3. Cerrar el gabinete superior. 4. Conectar el aparato al amplificador. (Conectar los altoparlantes a los bornes para conexión de los mismos.)	Tornillo de desplazamiento del sensor (Fig. 32)	1. Encender el interruptor de la corriente. 2. Apretar la tecla de programa 2 seguida del interruptor de arranque. 3. Una vez que el brazo sonoro haya descendido, apretar la tecla de programa 2 con el fin de saltar. 4. Asegurarse de que la posición de descenso se encuentre en el número "20 ~ 21". 5. De estar equivocada la posición de descenso, abrir el gabinete superior y girar el tornillo de desplazamiento del sensor. 6. Cerrar el gabinete superior y apretar la tecla de programa 2. 7. Regular de manera tal que la posición de descenso quede en el número "20 ~ 21". Repetir los pasos del 4 al 7.
7	**Angulo de descentramiento del brazo sonoro**	1. Abrir el gabinete superior y sujetar el interruptor del mismo con cinta. 2. Cerrar el gabinete superior.	Tornillo de ajuste (Fig. 33)	1. Encender el interruptor de la corriente y apretar el interruptor de arranque para hacer el brazo sonoro se mueva hacia adentro. 2. Abrir el gabinete superior. 3. Girar el tornillo de ajuste de manera tal que el centro del brazo concuerde con la ranura en V de la barra de elevación.

Paso	Punto tratado	Preparativos para el ajuste	Porción a ajustar	Manera de hacer el ajuste
8	**Ganancia del servomecanismo y tensión de desnivel**	1. Abrir el gabinete superior y sujetar el interruptor del mismo con cinta. 2. Cerrar el gabinete superior. 3. Conectar el voltímetro de corriente continua al borne 3 de CN301 a al borne de conexión a tierra. 4. Quitar la etiqueta de la tapa del brazo sonoro.	VR501 (Ganancia del servomecanismo) P.C.B. (Tablero de circuito impreso) (Tensión de desnivel) (Fig. 32)	1. Encender el interruptor de la corriente y apretar el interruptor de arranque para hacer que el brazo sonoro se desplace hacia adentro. 2. Abrir el gabinete superior. 3. Desplazar el brazo sonoro completamente hacia la derecha. A continuación, regular VR501 de manera tal que la tensión resulte de 3,6V. (Ganancia del servomecanismo) 4. Colocar el brazo sonoro en el centro y asegurarse de que la tensión de salida sea de 1,8V. 5. Si la tensión no corresponde a 1,8V, aflojar el tornillo del tablero de circuito impreso y mover el tablero hacia la derecha o hacia la izquierda usando un destornillador de manera que la tensión de salida resulte de 1,8V. Acabado de regular, volver a apretar el tornillo del tablero de circuito impreso. (Ajuste de desnivel)
9	**Velocidad de rotación**	1. Abrir el gabinete superior y colocar el disco.	VR201 (45 r.p.m.) VR202 (33 r.p.m.)	1. Encender el interruptor de la corriente. 2. Colocar el interruptor selector de velocidad en 45 revoluciones. 3. Girar VR201 de manera de lograr regular la velocidad a la velocidad de régimen (de 45 r.p.m.). 4. Colocar el interruptor selector de velocidad en 33 revoluciones. 5. Girar VR202 de manera delograr regular la velocidad a la velocidad de régimen (de 33-1/3 r.p.m.). Nota: Recordarse de regular la velocidad de 45 revoluciones primero.

*** Nota**	
10	Poner el tiempo de barrido del osciloscopio en 0,2 s/cm o en 0,5 s/cm. Por ejemplo, en el caso de un alcance de 0,2 s/cm, regular de manera tal que la señal de terminación de colocación resulte suministrada 2 escalas (0,4 de segundo) más tarde que el suministro de la señal de salida del fonógrafo.

Printed in Japan
82099110 Ⓗ YW

[1] SERVICE SEMINAR

The 5th Europe Service Seminar was held in each countries from June 1st to July 8th, total 35 technicians joined the Seminar.

The contents of the seminar were explanation of circuit, operation for SV-P100 (PCM Recorder) and practice of adjustment.

Holding Countries : Sweden, W.Germany, Belgium, France and Canada

We should like to express our gratitude for the people who kindly cooperated with us to hold the seminars. Please let us have your continued help and cooperation as we are intending to hold similar seminars in future.

[2] INTRODUCTION OF NEW PROGRAMBLE TURNTABLE SL-6

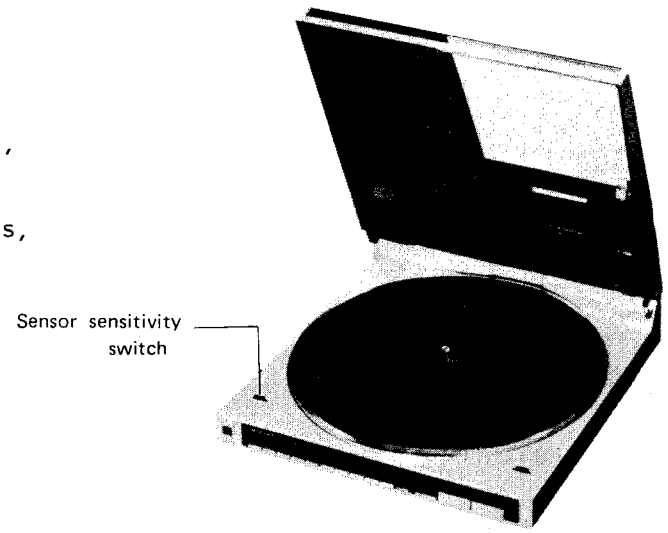
The SL-6 turntable from Technics is remarkable in a variety of ways. It's small enough to fit. Conveniently on a shelf (the SL-6 is only the size of a stack of about 20 record album). And the SL-6 is linear tracking, which means the tonearm tracks the records at the angle they were made. The SL-6 also uses our direct drive motor for fine performance – and the plug-in connector system, so performance can not be lessened by a poorly mounted cartridge. Perhaps most interesting of all, however, is the flexibility of operation in this fully automatic turntable.

Random access programming capability enables you to exercise choice (while enjoying convenience) when listening to record albums. You can, at the push of a few. Programming keys, decide which songs you want to hear, as well as the order in which you want to hear them.

(1) Automatic Program Selection

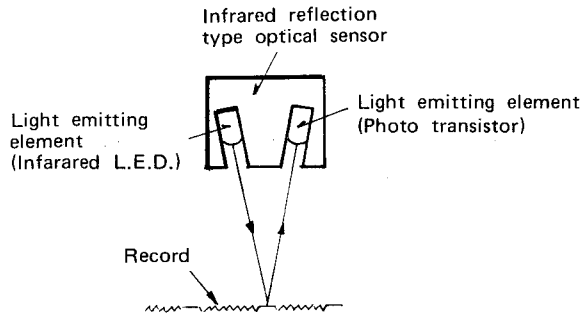
Optical sensor unit

The infrared reflection type optical sensor, separate from the cartridge, detects the number of tunes recorded and the positions, therefore the cartridge is compatible.

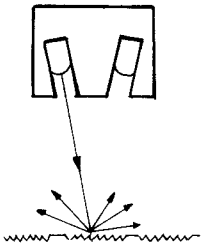


The optical sensor unit in the upper cabinet is interlocked with the arm, and the infrared ray emitted from the infrared LED of the sensor is applied to the record surface, and the reflection is received by the photo transistor. The reflection factor is higher at the positions between tunes, causing the quantity of light entering the photo transistor to increase. The reflection is disturbed at the sound grooves, causing the quantity of light entering the photo transistor to decrease.

The positions between tunes are found by detecting the difference in reflection factor between the blank part and sound groove part. The signal is processed by the microcomputer to control the arm operation.



Detectiong the blank between bands



Detecting the sound groove of record

Fig. 1

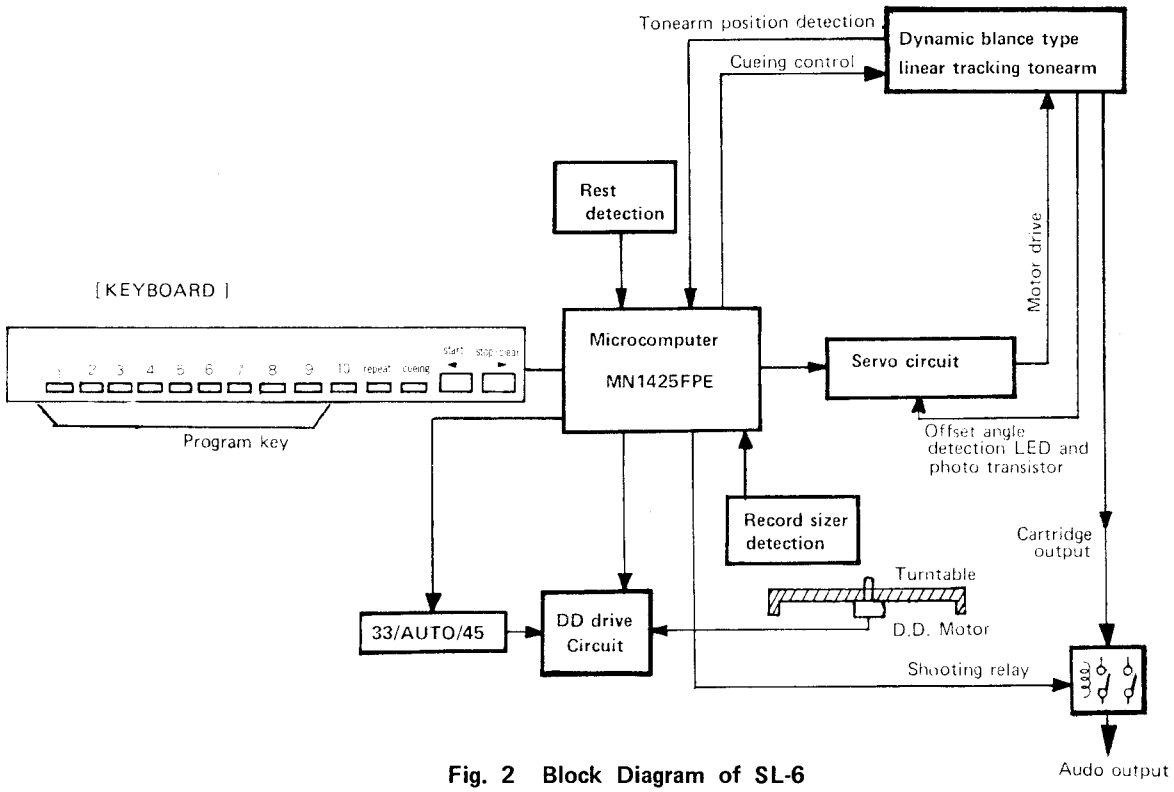


Fig. 2 Block Diagram of SL-6

(2) Features of cueing function (SL-6)

(a) The position is searched in a range of about ±2mm from the point initially found so that there is no chance of drop in wrong position.
If it is unable to find the position within a range of ±2mm, the searching is performed up to times.

(b) The searching ranges for LP and EP are different, and there is little probability of guide groove detection. When the stylus drops onto the guide groove, it goes to the next program.

(c) The cueing adjusting mechanism is attached to the arm, and it can be adjusted by use of a coin.

(d) The stylus correctly drops between tunes even in case of a deflected record.

(e) The program change can be done by pressing the stop/clear button.

(f) It returns by using the large pitch of guide groove.

(g) In order to eliminate groove noise at the first tune, the muting time for the first tune has been elongated.

[3] INTRODUCTION OF NEW JIGS FOR SL-6

We here introduce new jigs. One of them is a test record for adjustment of correct operation and the other is connector cord for adjustment.

Jig No : SFTR007 (Test Record)
SZZP1010F (Connector cord)

* INSTRUCTION

SIDE A :

The side A of the record has a configuration for sensor gain adjustment and resolving power adjustment as illustrated (Fig. 1).
(The sound grooves are not provided with signals.)

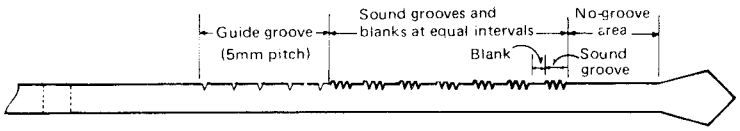


Fig. 1 Section view of side A

- Sensor gain adjustment is made at no-groove area.
- Sensor resolution adjustment is made at the sound grooves and blanks at equal intervals.

MEASUREMENTS AND ADJUSTMENTS

Item	Preparations for adjustment	Adjusting portion	Adjusting method
Sensor gain	1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 3) 2. Connect the oscilloscope to 6-pin (+) and 1-pin (−). 3. Put on the record for adjustment with side A up.	VR901 (Fig. 2)	1. Turn the power switch on and move the tonearm to the blank area of the record. 2. Adjust VR901 so that the output voltage is 4V ± 0.4V.
Sensor resolution	1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 3) 2. Connect the oscilloscope to 7-pin (+) and 1-pin (−). 3. Put on the record for adjustment with side A up.	VR902 (Fig. 2)	1. Turn the power switch on. 2. Push the program key to let it search the tonearm. (Output is delivered between the tunes.) 3. Adjust VR902 so that the peak output between tunes is 2.7V ± 0.27V. (Fig. 30)

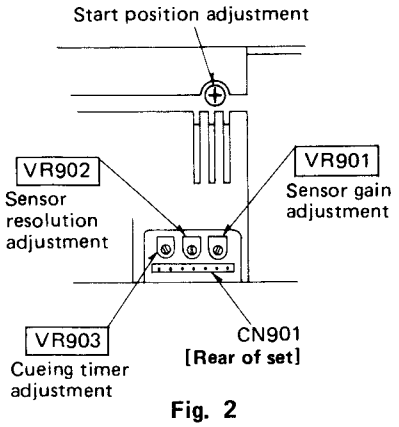


Fig. 2

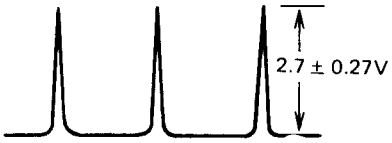


Fig. 4

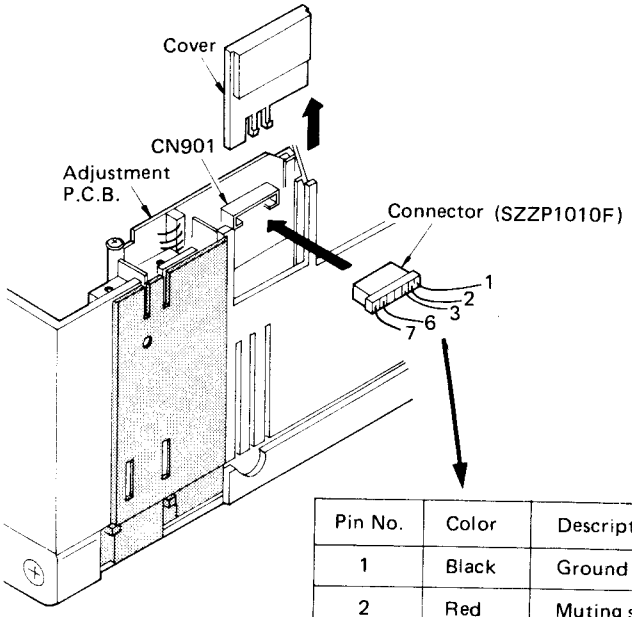


Fig. 3

Pin No.	Color	Description
1	Black	Ground
2	Red	Muting signal
3	Orange	Cueing signal
6	Blue	Sensor amp. output signal
7	Violet	Filter amp. output signal

SIDE B :

The Side B of the record has a configuration for checking the selection sensitivity for program play and drop blank position adjustment as illustrated below.
(The sound grooves are provided with wobble tone signals, and the blank areas, with counting in English.)

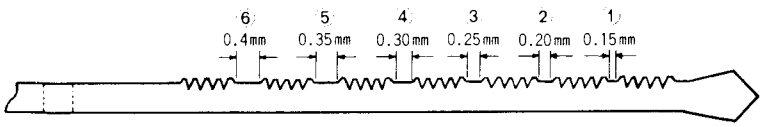
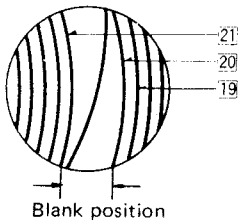


Fig. 5 Sectional view of side B



- When adjusting the stylus drop blank position, adjust it so that the stylus drops in a range of 20 ~ 21 at the blank of ③ 0.25mm wide. (After the adjustment at blank ③ 0.25mm, if it is checked at other blanks, the adjusting point may be sometimes deflected.)
- When checking the selection sensitivity, be sure to set the sensor gain switch to "M" (medium). L M H
  (After the adjusting the selection sensitivity, check to see that it passes the blanks of ① 0.15mm and ② 0.2mm wide with sensor gain switch at "M". If the blanks should be selected, re-adjust it because faulty selection may take place on a record having wider sound grooves.)

Item	Preparations for adjustment	Adjusting portion	Adjusting method
Descending between tunes	1. Open the upper cabinet and hold the cabinet switch with tape. 2. Put on the record for adjustment with side B up. 3. Close the upper cabinet. 4. Connect the unit to the amplifier. (Connect the speakers to speaker terminals.)	Sensor shifting screw (Fig. 7)	1. Turn the power switch on. 2. Push the program key 2, followed by start switch. 3. After completion of cueing down, push the program key 2 for the purpose of skipping. 4. Make sure that descending position is at count "20 ~ 21". 5. If the descending position is wrong, open the upper cabinet and turn the sensor shifting screw. 6. Close the upper cabinet and push the program key 2. 7. Adjust so that the descending position is at count "20 ~ 21". Repeat steps 4 ~ 7.
Cueing timer	1. Remove the cover and insert the connector for adjustment into terminal CN901. (Fig. 2) 2. Connect the unit to the amplifier. (Photo output) 3. Connect 3-pin (+) and 1-pin (—) to the channel (1) of two channel oscilloscope. 4. Connect the speaker terminal of amplifier to the channel (2) of two channel oscilloscope. 5. Connect the 2-pin and 1-pin. (Muting operation stops.) 6. Put on the record for adjustment with side B up.	VR903 (Fig. 2)	1. Turn the power switch on. 2. Move the tonearm to a recorded (groove) part of the record, and push the cueing switch for cueing down. 3. Check the time until completion of cueing (rise of cueing signal) after the stylus touches the record surfase. 4. Adjust VR903 so that the time until completion of cueing is 0.3 ~ 0.5 sec. (Fig. 6) Note: Set the sweep time of oscilloscope to 0.2 sec/cm or 0.5 sec/cm. For example, in the case of 0.2 sec/cm range, adjust it so that the cueing completion signal.is delivered 2 scale (0.4 sec) later than delivery of phono output signal.

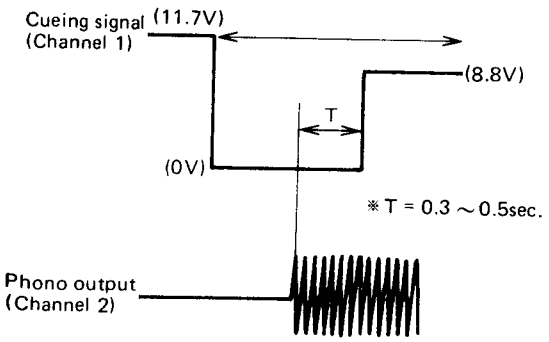


Fig. 6

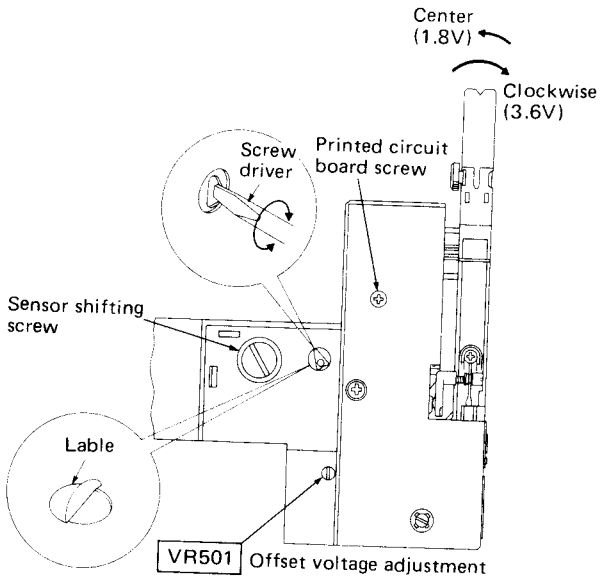


Fig. 7

[4] SPARE PARTS SPOT DELIVERY REPORT.

° June, 1982

Order entry form	Items ordered	Items shipped	Prompt supply ratio (%)
Air	2231	2124	95.2
Boat	2623	2492	95.0
Total	4854	4616	95.1

° July, 1982

Order entry form	Items ordered	Items shipped	Prompt supply ratio (%)
Air	1097	1047	95.4
Boat	2611	2502	95.8
Total	3708	3549	95.7

° August, 1982

Order entry form	Items ordered	Items shipped	Prompt supply ratio (%)
Air	1661	1572	94.6
Boat	2936	2794	95.2
Total	4597	4366	95.0

Prompt supply ratio is going down.

We are striving to improve it.

We would like to ask your cooperation to improve it.

SERVICE NEWS

NPS National Professional Service GmbH

an alle Kundendienst-Distributor
NPS Filialen
Herrn Garr, Herrn Iandriani,
Herrn Bobek

Nr.: 217	Datum: 27.Jan.1983 WK/MH 1/83
THEMA	TEXT
SL-6 Kein Start bei 17 cm Singles	Problem: Kein Start bei 17 cm Singles. Ursache: Manche 17 cm Singles sind außerhalb der Norm gepreßt. Dadurch kann es zu fehlerhafter Detectierung kommen.
ET-Bestell.Nr. SFNZC06S03	Abhilfe: Korrekturscheiben für 17 cm Singles werden unter dieser nicht als Standard zu betrachtende Schallplatte gelegt.
Nadelbeschädigung	PS: Die Korrekturscheibe muß nach Gebrauch entfernt werden, da es sonst zu Nadelbeschädigungen führen kann. NPS HH W. Klingler

SERVICE NEWS

Panasonic Service
Deutschland GmbH

Nr.: 328	Datum: 24. April 85	Peters/IS	14/85
THEMA	TEXT		

Jacket 88

Kombination mit SL-6
- brummt

Symptom : Im Zusammenhang mit SL-6 und Synchronkabel mit Adapter SJP2193 tritt bei Lautstärkeminimum in den Lautsprechern ein tieffrequentes Brummen auf.

Masseschleife verursacht -Brummen-

Grund : Es entsteht eine Masseschleife zwischen dem SL-6 und z.B. SU-8 durch die Anschlüsse:

a). Synchronkabel

b). Massekabel Plattenspieler (einadrig!)

Masseschleife entfernen

Abhilfe : Das Massekabel zwischen dem Plattenspieler und dem Verstärker muß entfernt werden.

Panasonic Service
Deutschland GmbH

☒ Niederlassungen SVC	☒ Autor. Händler BW	☐ Autor. Händler WW	☒ EK/VK
☒ KDZ	☐ Autor. Händler CarA	☒ QC	☒ Serviceberater / Schulung